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THE  
GENERA AND SPECIES  
OF  
BLASTOIDEA,  
WITH A  
LIST OF THE SPECIMENS  
IN THE  
BRITISH MUSEUM (NATURAL HISTORY).

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BY  
F. A. BATHER, M.A., F.G.S.,  
OF THE GEOLOGICAL DEPARTMENT.

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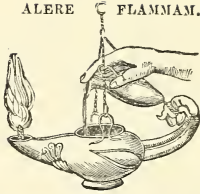
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## P R E F A C E.

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THIS work was originally designed to form one of a series of 'Lists of Types and Figured Specimens,' similar to that issued last year for the Fossil Cephalopoda. But since Mr. Bather found the compilation of a complete list of species and of specimens in the Collection to be a necessary aid to his curatorial duties, it was thought that such an Index might prove useful to workers in this group in other Museums.

The restricted range of the Blastoidea has rendered it possible to condense the list into limits suitable for publication, and its alphabetical form renders it very convenient for reference.

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Geological Department,  
British Museum (Natural History),  
Cromwell Road, S.W.  
March 30th, 1899.





# INTRODUCTION.

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THE following List is intended to serve various purposes: First, it attempts to provide a complete index to every name that has ever been applied to a real or supposed Blastoid genus or species. Secondly, it indicates which of those names are now considered valid, and which are believed to be synonyms, giving cross-references from the latter to the former. Thirdly, it cites the literature bearing upon the nomenclature of each species, the bibliographic details being placed under the name now valid. Fourthly, it catalogues all the specimens of Blastoidea contained in the Geological Department of the British Museum (Natural History) at the time of writing (March, 1899). Lastly, it designates more particularly those among them that are of historical interest, as type-specimens or as having been figured, and supplies full references to the literature bearing on each individual specimen. Yet another purpose served by this method of compilation is that of a list of *Blastoidea a Museo Britannico desiderata*.

The index to names is arranged in alphabetical order. All names, whether valid or invalid, are printed in the same heavy type, those of genera being in capitals. The names of species have the generic component printed at full length, so as to remove a possible source of error from those who wish to cut up the index for a slip-catalogue. Since every combination of names that has been suggested is given in this alphabetical series, it has not been thought necessary to encumber the volume with a separate index to trivial names only. The list includes a few names that are not now considered to belong to Blastoids, but which have been so considered at one time or another.

The determination of certain names as valid, and the treatment of the rest as synonyma, was adopted for practical convenience. By this means the duplication, or even quadruplication, of references has been avoided, while all references to what is admittedly the same species have been brought under one heading. Since that heading can always be turned up from the cross-references, this introduction of personal opinion is a minor evil. In several instances (*e. g.* species of *Nucleocrinus* and *Orbitremites*) the names here held to be valid may not be those familiar to users of recent writings on the Blastoidea. The changes are in accordance with the most widely accepted rules of nomenclature, and have been made only when the facts of the case are undisputed. An enthusiast for priority

at all costs might prefer *Belocrinus* to *Metablastus*, and *Dimorphocrinus* to *Orophocrinus*; but in those instances the facts are open to question. In a few instances the change is not one of nomenclature alone, but consists in assigning certain specimens to a systematic position different from that in which they have hitherto been placed. Such changes are the result of a renewed examination of the specimens themselves, with better aids to comparison than those at the command of previous investigators. In the case of species inaccessible to the compiler, the views of the latest recognized authorities have been followed. The List is in no sense a revision.

The citations of literature are those bearing on the name or systematic position of the genus or species in question. They do not profess to afford an exhaustive guide to the literature of the Blastozoa. Nevertheless, reference to the authorities quoted will probably place the student in the way of finding out all writings on the subject that are of any importance. With the exception of two references to D. D. Owen's 'Catalogue of Geological Specimens illustrating the formation of the Ohio Valley,' 1843, and two to G. Troost's 'Geological Reports to the General Assembly of the State of Tennessee,' 1840, 1841, all the citations have been verified afresh for this work.

The specimens preserved in the Geological Department of the British Museum are catalogued under the names of the several species to which they are now referred. But when a specimen has previously been alluded to in scientific publications by one or more names, those names are here repeated in *italic* type in chronological order. Specimens that have never been so alluded to have no such italicised name, but are prefaced by a —, which in each case stands for the name in **broad-faced** type that immediately precedes it.

It follows from the foregoing paragraph that the italicised name is the sign of a historical specimen. Those specimens which have been figured are to be detected by the reference to the figure, which forms part of the bibliography of the specimen. Those specimens which have served as types are distinguished by the letter **Ⓒ**, which is always placed immediately after the reference to the publication in which the specimen was used as a type. The use of the word type and of the sign **Ⓒ** requires some explanation. The increased importance attached by modern systematists to these type-specimens has led to a more rigid definition of the term, and to a classification, with its appropriate terminology, of the various degrees of authenticity pertaining to those specimens which former writers confused under the one designation 'type.' The terms now coming into vogue have not been used in the body of this work, since it was felt that their brevity and convenience might not counterbalance their present unfamiliarity. The ideas expressed by the chief of these terms may, however, be recalled here in the form of definitions.

*Holotype*.—The single specimen selected as the standard of a species or variety, either by the fact of its being unique, or by the definite statement of the original author, or, in default of such statement, by the first subsequent author who may have restricted the species. If but a single specimen was figured by the author of the species, that specimen, unless confessedly abnormal, is regarded as the holotype.

*Cotype*.—When a species was based upon more than one specimen, and when none of them was selected as holotype, then all the original specimens rank as cotypes.

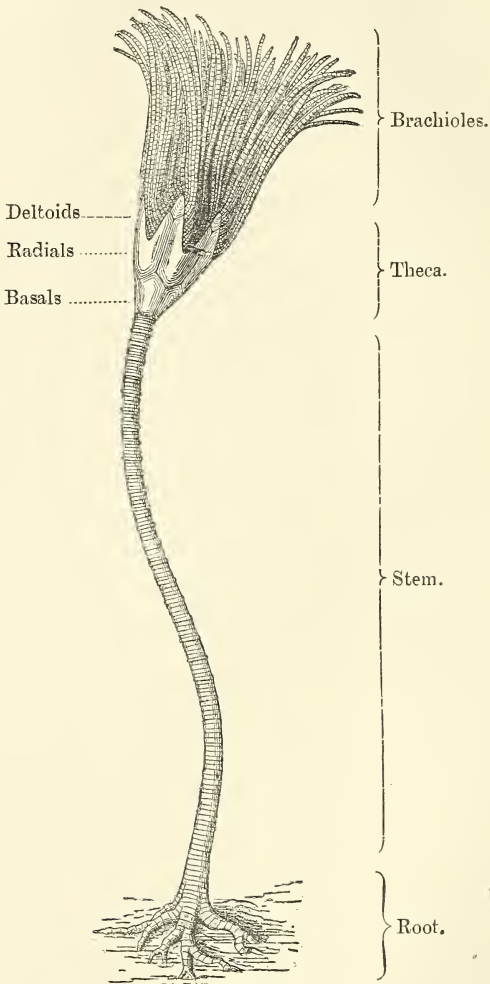
*Paratype*.—When a species was based upon more than one specimen, and when one has been selected as holotype, then all other original specimens are called paratypes.

*Metatype*.—A specimen that did not serve for the original description of the species, but that came from the same locality (and, in the case of fossils, from the same horizon), and that has been definitely determined as representative of his species by the original author.

As for the sign  $\text{\textcircled{C}}$  in the following List, it is affixed to all holotypes and cotypes, whether of valid species or of synonyms. In some instances it is affixed to paratypes, but only when neither the holotype nor a cotype of the species in question is preserved in the National Collection. In no case is the sign  $\text{\textcircled{C}}$  applied to a metatype, although, owing to the loss of all other type-specimens, such metatype may be the most valuable evidence extant for the interpretation of the original description.

It might be thought that the publication of the present list was hardly necessary, seeing that only thirteen years have elapsed since the Trustees of the British Museum issued the classical work by Robert Etheridge, fil., and P. Herbert Carpenter, entitled ‘Catalogue of the Blastoidea in the Geological Department of the British Museum (Nat. Hist.), with an account of the Morphology and Systematic Position of the Group, and a Revision of the Genera and Species.’ (4to. London, 1886.) There are, however, two reasons why such an opinion would be incorrect. First, as stated in the Editorial Preface to the fine volume in question, the authors originally intended their work as “a Memoir on the Blastoidea to be presented to one of the learned Societies.” It was turned into a British Museum Catalogue as an afterthought, and, perhaps for that reason, never attained that precision in the exposition of the actual material in the National Collection which is nowadays considered to be necessary in a Catalogue. Although the Catalogue of the Blastoidea gives a list of those species of the class that were contained in the Museum in 1886, yet it is only from the plates that the reader can gain any idea as to the specimens in the Collection. The second reason is that, partly owing to the interest aroused by the Catalogue of the Blastoidea, the Trustees have, during the last decade, acquired, either through donation or

by purchase, important additions to the collection of these Echinoderms. The present list, therefore, has come into being as a much-needed Supplement to the well-known Catalogue. Without the labours of Etheridge and Carpenter, its compilation would scarcely have been possible.



Restored figure of *Orophocrinus fusiformis*, Wachs. & Spr., a Blastoid from the Carboniferous (Kinderhook) of Iowa, U.S.A. Introduced to show the main parts of the typical Blastoid skeleton.

In consequence of the facts just detailed, it has been thought well to state shortly the nature of the various specimens. The terms used may here be explained. The Blastoid skeleton consists of three main



parts: Stem, Theca, and Brachioles. The Stem or Column is composed of Columnals. The Theca is composed of Basals, Radials, and Deltoids, along with the various elements of the pseudambulacral or subvective areas. The Brachioles are the small jointed processes that fringe these areas. The only internal organs alluded to are the Hydrospires, which are folds in the skeletal substance (stereom) of the radials and deltoids.

The material in the Museum at the time of publication of the Catalogue of Blastoidea had accrued mostly from the following sources:—The Gilbertson Collection from Lancashire and Yorkshire, noteworthy as containing many of G. B. Sowerby's type-specimens, which, along with others in the collection, were subsequently figured by J. Phillips. Renewed examination of these specimens and of Gilbertson's manuscript list, preserved in the Department, has resulted in the determination of more originals than were known to Etheridge & Carpenter. J. Rofe's Collection, from Yorkshire, valuable chiefly to the morphologist. L. G. de Koninck's Collection from Belgium: since this contains the holotype of *Pentremites waterhousianus*, it is possible that the types of *Mesoblastus crenulatus* and *Phænoschisma caryophyllatum* are also contained in it; but in the case of Blastoids it is almost impossible, without documentary evidence, to identify any individual specimen, unless, as in the case of *Pentremites waterhousianus*, it is distinguished by some abnormality. C. Wachsmuth's Collection, from the United States, especially Iowa: the specimens alluded to in the Catalogue as from the Wachsmuth Collection came not from this, but from the private collection of Wachsmuth & Springer; they are not in the Museum. Specimens transferred from the Museum of Practical Geology: all foreign, especially from Spain. Many other Spanish specimens, with a few from elsewhere, came through P. H. Carpenter, and others from S. P. Pratt. The J. E. Tennant Collection, British and foreign. Some other collectors from whom specimens were obtained were:—J. Bennie (Scotland), W. Cunnington (chiefly Kentucky), Lord Enniskillen (Ireland), T. Rupert Jones (Tennessee), J. E. Lee (Devonshire and the Eifel), J. N. Pearson (chiefly Alabama), L. Saemann (North America), and G. Sowerby (Alabama). The names of all collectors, when known, are quoted in the List, since they facilitate judgment as to the authenticity of the name and the locality, irrespective of the consideration whether the specimen was a gift or a purchase.

Since the publication of the Catalogue, the chief acquisitions have been: some good specimens of N. American species, previously represented badly or not at all, in exchange from Messrs. Wachsmuth & Springer. Specimens from Louisiana purchased of Mr. R. R. Rowley, and ranking in some cases as metatypes. Eighty specimens purchased of

Mr. T. A. Worthen. This last collection is a highly important addition. Not only do more than half the specimens belong to species previously unrepresented in the Collection, but nearly all bear the label of A. H. Worthen, thus conveying to us that eminent palæontologist's conception of various American species upon which European workers stood in great need of light. These specimens appear assignable to 9 genera, of which one (*Eleutherocrinus*) is exceedingly rare and new to the National Collection. They comprise 26 species, of which 12 were previously unrepresented in the Collection. All the specimens are good, and many of them exceptionally perfect.

The total number of specimens of Blastoidea now in the Geological Department of the British Museum is 1223. Of these, 435 come from localities within the United Kingdom; the rest are from Belgium, Germany, Spain, France (one specimen), the United States, and Canada. Thus all the regions from which Blastoids have been described are represented, with the exception of Australia.

The number of genera assigned to the Blastoidea is 22, and 18 of these may be studied in the National Collection, the desiderata being the rare *Pentephyllum* (of which the Museum possesses two plaster casts from the holotype) and *Asteroblastus*, *Blastoidocrinus*, and *Steganoblastus*, which are not Eublastoidea (= Blastoidea in the sense of Etheridge & Carpenter). The number of Blastoid species is about 166, and many of these are probably invalid; the 73 valid species preserved in the Museum may therefore be regarded as quite half the total number. The figured specimens in the Museum amount to 166, while several others are of historical interest. Of these, 15 are the holotypes of species, 6 the holotypes of varieties, 22 the cotypes of species, 3 the cotypes of varieties, 58 the paratypes of species, while about 30 may rank as metatypes. The number of species represented by holotypes or cotypes is 23; of varieties the holotypes are 6. Three species are represented by paratypes.

These figures speak for themselves. However numerous may be the specimens of Blastoidea in other museums, there can scarcely be any collection so representative of the class as a whole, or so rich in specimens of the highest scientific importance, as is that of the British Museum.

F. A. BATHER.

30th March, 1899.

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BLASTOIDEA.

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**ACENTROTREMITES**, R. Etheridge fl. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 232; and 1886, Cat. Blastoidea Brit. Mus. p. 234. Type-species—*A. ellipticus*.

**Acentrotremites ellipticus**. *Mitra elliptica*, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 33, pl. B [not A, as stated in text], ff. 1-3 (middle group). *Acentrotremites ellipticus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 233; and 1886, Cat. Blastoidea Brit. Mus. p. 235; and pp. 158, 237, where they consider it a possible syn. of *Pentremite globosa*, Say (q. v.).

*Acentrotremites ellipticus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 93, 108, 235, pl. xiii, ff. 17, 18, 19; and F. A. Bather, 1899, in Lankester's Zoology, Cap. Blastoidea, f. xiii. Lower Carboniferous Limestone: Somerset, England. [E. 782.]

**Acentrotremites sp.**, Etheridge & Carpenter, 1883: v. **Mesoblastus rofei** [E. 783].

**Asterial Fossil**, J. Parkinson, 1808: v. **Pentremites godoni**, et **P. godoni**, var. **florealis**.

**Asterite from Kentucky**, S. L. Mitchill, 1818: v. **Pentremites godoni**.

**ASTEROBLASTUS**, E. von Eichwald, 1862, Bull. Soc. géol. France (2) xix, p. 62. *Asteroblastus*, Eichwald: F. Schmidt, 1874, Mém. Acad. Imp. Sci. St. Pétersbourg (7) xxi, No. 11, p. 29. *Asterocystis* nov. gen. et *Asteroblastus*, Eichwald: E. Haeckel, 1896, Festschr. für Gegenbaur, i, pp. 116, 117. Type-species—*A. stellatus*.

**Asteroblastus stellatus**, E. von Eichwald, 1862, Bull. Soc. géol. France (2) xix, p. 62, & fig. Perhaps includes *Protocrinites foveolatus*, E. von Eichwald, 1859, Lethæa Rossica, Ancienne Période, Livr. v, p. 623, pl. xxxii, f. 8, *a, b, c.* *Asteroblastus stellatus*, Eichwald: F. Schmidt, 1874, Mém. Acad. Imp. Sci. St. Pétersbourg (7) xxi, No. 11, p. 29.

**Asteroblastus tuberculatus**, F. Schmidt, 1874, Mém. Acad. Imp. Sci. St. Pétersbourg (7) xxi, No. 11, p. 33, pl. iii, f. 9. *Asterocystis tuberculata* (Schmidt): E. Haeckel, 1896, Festschr. für Gegenbaur, i, p. 116.

**Asteroblastus volborthi**, F. Schmidt, 1874, Mém. Acad. Imp. Sci. St. Pétersbourg (7) xxi, No. 11, p. 32, pl. iii, ff. 6, 7, 8.

**ASTEROCYSTIS**, E. Haeckel, 1896: v. **Asteroblastus**.

**Asterocystis tuberculata** (F. Schmidt): E. Haeckel, 1896: v. **Asteroblastus tuberculatus**.

**ASTRACRINITES**, T. & T. Austin, 1842: v. **Zygocrinus**.

**ASTROCRINUS**, T. & T. Austin, 1843, non *Astrocrinus*, T. A. Conrad, 1840: nec *Asteroocrinus*, G. von Münster, 1838: v. **Zygocrinus**.

**Astrocrinus benniei**, Etheridge fl., 1876: v. **Zygocrinus benniei**.

**Astrocrinus tetragonus**, T. & T. Austin, 1843: v. **Zygocrinus tetragonus**.

**ASTROCYSTITES**, J. F. Whiteaves, 1897 (non *Asterocystis*, Haeckel): v. **Steganoblastus**.

**Astrocystites ottawaensis**, J. F. Whiteaves, 1897: v. **Steganoblastus ottawaensis**.

**BELEMNOCRINUS**, Munier-Chalmas, 1876, non *Belemnocrinus*, White, 1862: v. **Belocrinus**.

**Belemnocrinus cottaldi**, Munier-Chalmas, 1876: v. **Metablastus cottaldi**.

**BELOCRINUS**. *Belemnocrinus*, Munier-Chalmas, 1876, Journ. Conchyl. (3) xvi, p. 105. *Belocrinus*, Munier-Chalmas, 1881, Bull. Soc. géol. France (3) ix, p. 503. Type-species—*B. cottaldi*.

**Belocrinus cottaldi**, Munier-Chalmas, 1876: v. **Metablastus cottaldi**.



**BLASTOIDOCRINUS**, E. Billings, 1859, *Canad. Organic Remains*, dec. iv, p. 18. Type-species—*B. carchariædens*.

**Blastoidocrinus carchariædens**, E. Billings, 1859, *Canad. Organic Remains*, dec. iv, p. 18, pl. i, ff. 1 *a-n*. *Blastoidocrinus carchariædens*, Billings: F. Schmidt, 1874, *Mém. Acad. Sci. St. Pétersbourg* (7) xxi, No. 11, p. 29. *Blastoidocrinus carchariædens*, Billings: R. Etheridge fil. & P. H. Carpenter, 1886, *Cat. Blastoidea Brit. Mus.* p. 120.

**CODASTER**, F. McCoy, April 1849, *Ann. Mag. Nat. Hist.* (2) iii, p. 250. *Codonaster*, C. F. Roemer, 1851, *Arch. Naturges.* xvii (i) p. 381. *Codaster*, McCoy (including *Heteroschisma*, q. v.): R. Etheridge fil. & P. H. Carpenter, 1886, *Cat. Blastoidea Brit. Mus.* p. 259. Type-species—*C. acutus* (=young of *C. trilobatus*).

**Codaster acutus**, F. McCoy, April 1849, *Ann. Mag. Nat. Hist.* (2) iii, p. 251. *Codonaster acutus*, McCoy: C. F. Roemer, 1851, *Arch. Naturges.* xvii (i) p. 385; refers to it *Pentremites pentagonalis*, Forbes (q. v.). Etheridge & Carpenter refer to it *Pentremites* (?) *astriformis* (q. v.), and consider it as young of *Codaster trilobatus*: v. **C. trilobatus**, var. **acutus**.

**Codaster alternatus** (vel **attenuatus**) [both probably misprint for **attenuatus**], S. S. Lyon, 1857, in D. D. Owen's 3rd Rep. Geol. Surv. Kentucky, pp. 493, 498, pl. v, f. 3 *a* [non 3 *b*, v. *Codaster pyramidatus*]. *Heteroschisma alternatum* (Lyon): C. Wachsmuth, 1883, *Rep. Geol. Surv. Illinois*, vii, p. 353, footnote. *Codaster alternatus*, Lyon: R. Etheridge fil. & P. H. Carpenter, 1886, *Cat. Blastoidea Brit. Mus.* pp. 33, 265, 267. *Codaster attenuatus*, S. A. Miller, 1889, *N. Amer. Geol. & Palæont.* p. 232.

**Codaster alternatus**, var. **elongatus**. *Heteroschisma alternatum*, var. *elongatum*, C. Wachsmuth, 1883, *Rep. Geol. Surv. Illinois*, vii, p. 354, footnote. *Codaster alternatus*, var. *elongatus* (Wachsmuth): R. Etheridge fil. & P. H. Carpenter, 1886, *Cat. Blastoidea Brit. Mus.* pp. 33, 263, 267, pl. x, ff. 19, 20.

**Codaster americanus**, B. F. Shumard, 1858, *Trans. Acad. Sci. St. Louis*, i, p. 239. Regarded as probable var. of *C. pyramidatus*, Shumard (q. v.): R. Etheridge fil. & P. H. Carpenter, 1886, *Cat. Blastoidea Brit. Mus.* p. 265.

**Codaster attenuatus**: v. **Codaster alternatus**.

**Codaster blairi**, S. A. Miller & W. F. E. Gurley, Dec. 1895, *Bull. Illinois Mus.* vii, p. 86, pl. v, ff. 20, 21, 22.

**Codaster canadensis**, E. Billings, 1869, *Amer. Journ. Sci.* (2) xlviii, p. 79. R. Etheridge fil. & P. H. Carpenter, 1882, *Ann. Mag. Nat. Hist.* (5) ix, p. 236, and 1886, *Cat. Blastoidea Brit. Mus.* p. 265, refuse to

[**Codaster canadensis**, continued.]

accept this, but think it possibly equals their *Codaster hindei* (q. v.).  
*Codaster canadensis*, Billings (including *C. hindei*): J. F. Whiteaves,  
 1887, Contrib. Canad. Palæont. i, p. 109, pl. xiv, ff. 4, 4 a.

**Codaster conicus**, G. F. Whidborne, 1899, Pal. Soc. for 1898, Mon.  
 Devon. Fauna, iii (3) p. 214, pl. xxix, ff. 4, 4 a.

**Codaster gracilis**. *Heteroschisma gracile*, C. Wachsmuth, 1883, Rep.  
 Geol. Surv. Illinois, vii, p. 354. *Codaster gracilis* (Wachsmuth): R.  
 Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 265.  
 (Perhaps includes *Pentremites subtruncatus*, Hall; see Wachsmuth, *op.*  
*cit. supra*, p. 357, and *Codaster?* *subtruncatus*.)

— . Devonian, Upper Hamilton Group: Thunder Bay, L. Huron,  
 Michigan, U.S.A. [E. 8028.] T. A. Worthen Coll., labelled  
 “*Codaster subtruncatus*, Hall.” One theca.

**Codaster gracillimus**, R. R. Rowley & S. J. Hare, July 1891, Kansas  
 City Scientist, v, p. 99, pl. ii, ff. 6, 7.

**Codaster grandis**, R. R. Rowley & S. J. Hare, July 1891, Kansas  
 City Scientist, v, p. 99, pl. ii, f. 8.

**Codaster gratosus**, S. A. Miller, 1880, Journ. Cincinnati Soc. Nat.  
 Hist. ii, p. 257, pl. xv, ff. 5, 5 a. “An internal cast . . .” not *Codaster*,  
 R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus.  
 p. 265. “Too imperfect for recognition,” C. R. Keyes, 1894, Bull.  
 Geol. Surv. Missouri, iv, p. 142.

**Codaster hindei**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag.  
 Nat. Hist. (5) ix, p. 235; and 1886, Cat. Blastoidea Brit. Mus. p. 265,  
 pl. xii, ff. 4-7, “possibly identical with *C. canadensis*, Billings, MS.”  
 Syn. of *Codaster canadensis*, Billings: ? J. F. Whiteaves, 1887, Contrib.  
 Canad. Palæont. i, p. 109.

**Codaster jessieæ**, S. A. Miller & W. F. E. Gurley, July 1896, Bull.  
 Illinois Mus. x, p. 89, pl. v, ff. 20, 21, 22.

**Codaster kentuckyensis** (Shumard): Shumard, 1866: v. **Phæno-**  
**schisma? kentuckyense**.

**Codaster? pentalobus**, J. Hall, 1882: v. **Metablastus? penta-**  
**lobus**.

**Codaster pousirewskii**. *Codonaster pousirewskii*, A. Stuckenber,  
 1875, Materialui Gheol. Rossii, vi, p. 99, pl. ii, ff. 4 a-d.

**Codaster? pulchellus**. *Codaster pulchellus*, S. A. Miller & C. B. Dyer,  
 1878, Journ. Cincinnati Soc. Nat. Hist. i, p. 35, pl. ii, ff. 13, 13 a.  
*Codaster (Stephanocrinus?) pulchellus*, Miller & Dyer: J. Hall, 1879,

Trans. Albany Inst. x, p. 12; and 1882, Rep. Geol. Surv. Indiana, xi (1881), p. 280. *Codaster? pulchellus*, Miller & Dyer: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 266.

**Codaster pyramidatus.** *Codaster alternatus* (pars), S. S. Lyon. 1857, in D. D. Owen's 3rd Rep. Geol. Surv. Kentucky, pl. v, f. 3*b* (non 3*a*). *Codaster pyramidatus*, B. F. Shumard, 1858, Trans. Acad. Sci. St. Louis, i, p. 238, pl. ix, ff. 1 *a-e*. *Codaster pyramidatus*, Shumard: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 266.

*Codaster pyramidatus*, Shumard: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 30, 80, 266, pl. xii, ff. 1, 2, 3. Lower Devonian, Corniferous Limestone: Columbus, Ohio, U.S.A. [E. 658.] One theca, presented by H. A. Nicholson.

**Codaster stelliformis** (Owen & Shumard): Shumard, 1866: v. **Orophocrinus stelliformis**.

**Codaster? subtruncatus.** *Pentremites subtruncatus*, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (ii), p. 485, pl. i, f. 4 (non pl. ii, f. 3). ? *Heteroschisma gracile*, C. Wachsmuth, 1883, Rep. Geol. Surv. Illinois, vii, p. 357. *Troostocrinus subtruncatus* (Hall): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 249. *Codaster? subtruncatus* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 138, 266. Vide etiam **Codaster gracilis**.

**Codaster trilobatus**, F. McCoy, 1849, Ann. Mag. Nat. Hist. (2) iii, p. 251. *Codonaster trilobatus*, McCoy: C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 386. *Codaster et Codonaster trilobatus*, McCoy: F. McCoy, 1851, in Sedgwick & McCoy, Brit. Pal. Foss. fasc. 1, p. 123, pl. iii D, ff. 8, 8*a*. *Codaster trilobatus*, McCoy: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 268.

*Codonaster*, McCoy: J. Rofe, June 1865, Geol. Mag. (1) ii, p. 251, pl. viii, f. 13. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [57841.] Presented by J. Rofe. Thin section, horizontal, showing hydrospires.

*Codonaster*, McCoy: J. Rofe, June 1865, Geol. Mag. (1) ii, p. 251, pl. viii, f. 12. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [57842.] Presented by J. Rofe. Thin section, vertical, showing hydrospires.

*Codaster trilobatus*, McCoy: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 269, suggest that these are probably the "New genus. Bolland," sub "Echinida" of J. Phillips, 1836, Geol. Yorksh. pt. ii, p. 208; they refer to "certain labels accompanying the specimens;" there are none, but there is a MS. list in which "New genus" comes immediately after *Pentremites*. Lower Carboniferous, Carboniferous Limestone: ? Bolland, Lancashire, England. [E. 834.] Gilbertson Coll., No. 81 *c*. Five thecas.

[*Codaster trilobatus*, continued.]

- Codaster trilobatus*, McCoy. R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 32, 268, pl. xii, f. 8. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8009.] Presented by J. Rofe. Theca with top ground down.
- Codaster trilobatus*, McCoy: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 31, 268, pl. xiii, f. 4. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8010.] Presented by J. Rofe. Theca with four hydrospire-slits on each side of an ambulacrum.
- Codaster trilobatus*, McCoy: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 88, 268, pl. xiii, f. 6. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8011.] Presented by J. Rofe. Theca with a radial removed by weathering.
- Codonaster*, McCoy: J. Rofe, June 1865, Geol. Mag. (1) ii, p. 251, pl. viii, f. 14. *Codaster trilobatus*, McCoy: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 88, 268, pl. xiii, ff. 5, 7. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8012.] Presented by J. Rofe. Theca ground horizontally from above, as well as vertically at right angles to left anterior interradius.
- Codaster trilobatus* McCoy: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 22, 23, 24, 268, pl. xiii, ff. 1, 2, 3: said to be drawn from one "very perfect specimen," but really from these two slightly imperfect thecas. *Codaster trilobatus*, McCoy: F. A. Bather, 1899, in E. Ray Lankester's Zoology, Cap. Blastoidea, ff. v, 4, 5. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8013.] Presented by J. Rofe.
- Codaster trilobatus*, McCoy: F. A. Bather, 1899, in E. Ray Lankester's Zoology, Cap. Blastoidea, f. v, 2. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8023.] Presented by J. Rofe. Ground section, horizontal.
- Codaster trilobatus*, McCoy: F. A. Bather, 1899, in E. Ray Lankester's Zoology, Cap. Blastoidea, f. vi. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8027.] Presented by J. Rofe. Two thecas, forming basis of above-quoted figure.
- Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England.
- [75908.] Presented by J. Rofe. Ten thecas.
- [E. 836.] Six thecas.
- [E. 838.] Sixteen ground and polished specimens.
- [E. 1052.] Presented by J. Rofe. Microscope section, vertical, showing hydrospires.
- [E. 8014.] A theca ground vertically across right anterior and anterior radii.
- [E. 8015.] Weathered theca.
- [E. 8016.] Tegmen ground from below, with hydrospires in posterior interradius.
- [E. 8017.] Three thecas.



[E. 8021.] Theca with hydrospires in posterior interradius.

[E. 8022.] Section across ambulacrum, right posterior and right anterior radii.

[E. 8024.] Presented by J. Rofe. Five ground and polished specimens.

— Lower Carboniferous, Carboniferous Limestone: England.

[E. 80.] Five thecas.

[E. 7991.] Harford Coll. Two thecas.

— Lower Carboniferous, Carboniferous Limestone: Bolland(?), Lancashire, England.

[E. 8029.] Gilbertson Coll. Theca with hydrospires in posterior interradius.

[E. 8186.] Gilbertson Coll., No. 81 d: "new genus; with only four divisions or rays," Gilbertson MS. Cat. Theca imperfect, but apparently four-sided.

**Codaster trilobatus**, var. **acutus**. *Pentremites? astraformis*, nom. nud., T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111. *Pentremites pentagonalis*, E. Forbes, 1848, Mem. Geol. Surv. Gt. Brit. ii (2), p. 529, f. a. *Codaster acutus*, F. McCoy, 1849, Ann. Mag. Nat. Hist. (2) iii, p. 251. *Codonaster acutus*, McCoy: C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 385 (excl. syn. "*Astrocrinites*, Cumberland"). *Codaster et Codonaster acutus*, McCoy: F. McCoy, 1851, in Sedgwick & McCoy, Brit. Pal. Foss. fasc. 1, p. 123, pl. 3 D, f. 7. *Codaster trilobatus*, var. *acutus*, McCoy: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 269.

*Codaster trilobatus*, var. *acutus*, McCoy: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 269, pl. xiii, ff. 13, 15. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8018.] One large theca, with more pointed base.

*Codaster trilobatus*, var. *acutus*, McCoy: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 24, 55, 269, pl. xiii, ff. 12, 14. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8019.] A theca; the side-view, said to be from this specimen, is much restored.

*Codaster trilobatus*, var. *acutus*, McCoy: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 23, 269, pl. xiii, ff. 9, 10, & pl. xvi, f. 2. *Codaster trilobatus*, var. *acutus*, McCoy: F. A. Bather, 1899, in E. Ray Lankester's Zoology, Cap. Blastoidea, f. v, 1. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 8020.] Very young theca.

— Lower Carboniferous (Carboniferous Limestone): ? Bolland, Lancashire. [E. 835.] Gilbertson Coll. Four thecas.

— Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England.

[E. 837.] Twenty thecas.

[E. 839.] Eighteen thecas.

[E. 8025.] One theca, showing ambulacra.

[E. 8026.] Two thecas, showing covering-plates of peristome.

**Codaster whitei**, J. Hall, 1861 : v. **Orophocrinus whitei**.

**Codaster** sp. Lower Carboniferous, Upper Burlington Limestone, Chert : Louisiana, Mo., U.S.A. [E. 8004.] One internal cast.

**CODONASTER**, C. F. Roemer, 1851, emendation for **Codaster** (q. v.). For all species, see under *Codaster*.

**CODONITES**, F. B. Meek & A. H. Worthen, 1869, identical with **Orophocrinus** (q. v.).

**Codonites campanulatus**, G. Hambach, 1884 : v. **Orophocrinus stelliformis**, var. **campanulatus**.

**Codonites conicus**, S. A. Miller, 1889 : v. **Orophocrinus whitei**.

**Codonites fusiformis**, S. A. Miller, 1889 : v. **Orophocrinus fusiformis**.

**Codonites gracilis**, F. B. Meek & A. H. Worthen, 1873 : v. **Orophocrinus gracilis**.

**Codonites inopinatus**, R. R. Rowley & S. J. Hare, 1891 : v. **Orophocrinus inopinatus**.

**Codonites stelliformis** (Owen & Shumard) : F. B. Meek & A. H. Worthen, 1869 : v. **Orophocrinus stelliformis**.

**CRYPTOBLASTUS**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 229. Type-species—*C. melo*.

**Cryptoblastus** ? **kirkwoodensis**. *Elæacrinus kirkwoodensis*, B. F. Shumard, 1863, Trans. Acad. Sci. St. Louis, ii, p. 113. *Cryptoblastus* ? *kirkwoodensis* (Shumard) : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 232. *Cryptoblastus kirkwoodensis* (Shumard) C. R. Keyes, 1894, Rep. Geol. Surv. Missouri, iv, p. 139, pl. xviii, ff. 8 a, b.

**Cryptoblastus melo**. *Pentremites melo*, D. D. Owen & B. F. Shumard, 1850, Journ. Acad. Nat. Sci. Philadelphia (2) ii, p. 65, pl. vii, ff. 14 a-c. *Elæacrinus melo* (Owen & Shumard) : B. F. Shumard, 1863, Trans. Acad. Sci. St. Louis, ii, p. 112. *Granatoecrinus melo* (Owen & Shumard) : B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 375. *Schizoblastus melo* (Owen & Shumard) : R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 246. *Cryptoblastus melo* (Owen & Shumard) : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 232.

— Lower Carboniferous, Lower Burlington Limestone : Burlington, Iowa, U.S.A.

[E. 813.] Wachsmuth Coll. Twelve thecas.

[E. 8178.] Worthen Coll. *ex* G. T. Nealley Coll. Two thecas.

——. Lower Carboniferous, Lower Burlington Limestone: Louisiana, Mo., U.S.A. [E. 8007.] R. R. Rowley Coll. Four internal casts in chert, two whole thecas in limestone matrix, one free theca.

——. Lower Carboniferous, Upper (?) Burlington Limestone: Burlington, Iowa, U.S.A. [E. 8100.] Wachsmuth Coll. One theca.

**Cryptoblastus pisum.** *Granatocrinus pisum*, F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 89; and 1873, Rep. Geol. Surv. Illinois, v, p. 470, pl. ix, f. 4. *Cryptoblastus pisum* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 232.

**Cryptoblastus ? projectus.** *Pentremites melo*, var. *projectus*, F. B. Meek & A. H. Worthen, 1861, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 142. *Granatocrinus melo*, var. *projectus* (Meek & Worthen): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 375. *Granatocrinus projectus* (Meek & Worthen), F. B. Meek & A. H. Worthen, 1868, Rep. Geol. Surv. Illinois, iii, p. 496. *Schizoblastus ? projectus* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 223. *Cryptoblastus ? projectus* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 232. *Granatocrinus neglectus* (Meek & Worthen): C. R. Keyes, 1894, Rep. Geol. Surv. Missouri, iv, p. 139, is an error depending on a wrong reference.

**CRYPTOSCHISMA**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 280. Type-species—*C. schulzi*.

**Cryptoschisma schulzi.** *Pentremites schultzi*, E. J. A. d'Archiac & P. E. P. de Verneuil, 1845, Bull. Soc. géol. France (2) ii, p. 479, pl. xv, ff. 12 a, b, 13 a, b. *Pentremitidea schultzi* (d'Archiac & de Verneuil): A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i, p. 102. *Pentatrematites schultzi* (d'Archiac & de Verneuil): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 369. *Cryptoschisma schulzi* (d'Archiac & de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 281.

*Cryptoschisma schulzi* (d'Archiac & de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 90, 281, pl. xviii, f. 2. Lower Devonian, Calcaire d'Arnao: Colle near Sabero, Leon [not "Asturias," as in Explanation of Plate], Spain. [E. 1063 a.] Longitudinal micro-section of theca.

*Cryptoschisma schulzi* (d'Archiac & de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 32, 281, pl. v, f. 24. Lower Devonian, Calcaire d'Arnao: Sabero, Leon, Spain. [E. 8089.].

*Cryptoschisma schulzi* (d'Archiac & de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 21, 281, pl. v,

[**Cryptoschisma schulzi**, continued.]

f. 25. Lower Devonian, Calcaire d'Arnao: Sabero, Leon, Spain.  
[E. 8090.] A theca with part of stem.

*Cryptoschisma schulzi* (d'Archiac & de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 89, 281, pl. v, f. 23. Lower Devonian, Calcaire d'Arnao: Sabero, Leon, Spain.  
[E. 8091.]

*Cryptoschisma schulzi* (d'Archiac & de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 97, 281, pl. xiii, f. 20. Lower Devonian, Calcaire d'Arnao: Sabero, Leon, Spain.  
[E. 8092.]

——. Lower Devonian, Calcaire d'Arnao: Sabero, Leon, Spain.  
[E. 784.] Thirty-four thecas, some with portions of stem.

——. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 1063 b.] Longitudinal micro-section of theca.

**DIMORPHICRINUS**, A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i, p. 155. Type-species—*Platycrinites pentangularis*, J. S. Miller. v. **Orophocrinus**.<sup>1</sup>

**Dimorphocrinus pentangularis** (J. S. Miller): A. D. d'Orbigny, 1849: v. **Orophocrinus pentangularis**.

**Echinus species, Kentucky**, S. L. Mitchill, 1808: v. **Pentremites godoni**.

**Echinus of the family galerite**, S. L. Mitchill, 1818: v. **Pentremites godoni**.

**ELÆACRINUS**, C. F. Roemer, 1851: syn. of **Nucleocrinus** (q. v.).

**Elæacrinus angularis** (Lyon): B. F. Shumard, 1866: v. **Nucleocrinus angularis**.

**Elæacrinus canadensis** (Montgomery): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus elegans**.

**Elæacrinus conradi** (Hall): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus conradi**.

**Elæacrinus cornutus**, B. F. Shumard, 1863: v. **Heteroblastus? cornutus**.

**Elæacrinus curtus**, B. F. Shumard, 1863: v. **Orbitremites? curtus**.

<sup>1</sup> Miller's species is accepted. D'Orbigny understood that it was a Blastoid, for he compared it with *Aplocrinus*, which he (though erroneously) considered as a Pentremite. Nevertheless *Dimorphocrinus* "has never been adopted by palæontologists on account of the erroneous and incomplete nature of his generic diagnosis," Eth. & Carp. 1886, Cat. Blast. p. 293. Few modern systematists regard such reasoning as cogent.



- Elæacrinus elegans** (Conrad): B. F. Shumard, 1866: v. **Nucleocrinus elegans**.
- Elæacrinus ? globosus** (Say): B. F. Shumard, 1866: v. **Pentremites ? globosus**.
- Elæacrinus kirkwoodensis**, B. F. Shumard, 1863: v. **Cryptoblastus ? kirkwoodensis**.
- Elæacrinus lotoblastus** (White): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Orbitremites ? lotoblastus**.
- Elæacrinus lucina** (Hall): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus lucina**, J. Hall.
- Elæacrinus lucina**, var. **canadensis** (Montgomery): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus elegans**.
- Elæacrinus melo** (Owen & Shumard): B. F. Shumard, 1863: v. **Cryptoblastus melo**.
- Elæacrinus meloniformis**, W. H. Barris, 1883: v. **Nucleocrinus meloniformis**.
- Elæacrinus norwoodi** (Owen & Shumard): B. F. Shumard, 1863: v. **Orbitremites norwoodi**.
- Elæacrinus obovatus**, W. H. Barris, 1883: v. **Nucleocrinus obovatus**.
- Elæacrinus verneuili** (G. Troost): C. F. Roemer, 1851: v. **Nucleocrinus verneuili**.
- Elæacrinus verneuili**, var. **pomum**, R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus verneuili**, var. **pomum**.
- Elæacrinus sp.**, R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus obovatus** [E. 822].
- ELEUTHEROCRINUS**, B. F. Shumard & L. P. Yandell, 1856, Proc. Acad. Nat. Sci. Philadelphia, viii, p. 74. *Eleutherocrinus*, Shumard & Yandell: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 294. Type-species—*E. cassedayi*.
- Eleutherocrinus cassedayi**, B. F. Shumard & L. P. Yandell, 1856, Proc. Acad. Nat. Sci. Philadelphia, viii, p. 74, pl. ii. *Eleutherocrinus cassedayi*, Shumard & Yandell: J. F. Whiteaves, 1887, Contrib. Canad. Palæont. i, p. 110, pl. xiv, ff. 5, 5 a-b.
- . Devonian, Upper Hamilton Group. Beargrass Creek, Jefferson Co., Kentucky, U.S.A. [E. 8177.] T. A. Worthen Coll. A theca, partly in matrix.

- Eleutheroocrinus whitfieldi**, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 151.
- Encrina godoni**, J. L. M. DeFrance, 1819: v. **Pentremites godoni**.
- Encrinites florealis**, E. F. von Schlotheim, 1820: v. **Pentremites godoni**, var. **florealis**.
- GRANATOCRINITES**, G. Troost, 1849: syn. of **Orbitremites** (q. v.).
- Granatocrinites cidariformis**, G. Troost, 1849: v. **Orbitremites ? granulatus**.
- GRANATOCRINUS**, J. Hall, 1862: syn. of **Orbitremites** (q. v.).
- Granatocrinus angulatus**, R. Etheridge fil. & P. H. Carpenter (?): v. **Mesoblastus angulatus**.
- Granatocrinus aplatus**, R. R. Rowley & S. J. Hare, 1891: v. **Orbitremites aplatus**.
- Granatocrinus campanulatus** (McCoy): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orbitremites campanulatus**.
- Granatocrinus concinnulus**, R. R. Rowley & S. J. Hare, 1891: v. **Orbitremites concinnulus**.
- Granatocrinus cornutus** (Meek & Worthen): B. F. Shumard and F. B. Meek & A. H. Worthen, 1866: v. **Heteroblastus ? cornutus**.
- Granatocrinus curtus** (Shumard): B. F. Shumard, 1866: v. **Orbitremites ? curtus**.
- Granatocrinus derbiensis** (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orbitremites derbiensis**.
- Granatocrinus ellipticus** (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orbitremites ellipticus**.
- Granatocrinus elongatus**, R. Etheridge fil. & P. H. Carpenter, 1882: v. **Mesoblastus elongatus** and **Mesoblastus sowerbyi**.
- Granatocrinus excavatus**, R. R. Rowley & S. J. Hare, 1891: v. **Orbitremites excavatus**.
- Granatocrinus exiguus**, R. R. Rowley & S. J. Hare, 1891: v. **Orbitremites exiguus**.
- Granatocrinus fimbriatus**, F. B. Meek & A. H. Worthen, 1869: v. **Orbitremites fimbriatus**.

- Granatocrinus glaber**, F. B. Meek & A. H. Worthen, 1869 :  
v. **Mesoblastus ? glaber**.
- Granatocrinus ? globosus** (Say): B. F. Shumard, 1866 : v. **Pen-**  
**tremites ? globosus**.
- Granatocrinus granulatus** (Roemer): J. Hall, 1862 : v. **Orbi-**  
**tremites granulatus**.
- Granatocrinus granulosus**, F. B. Meek & A. H. Worthen, 1865 :  
v. **Schizoblastus ? granulosus**.
- Granatocrinus leda** (Hall): J. F. Whiteaves, 1887 : v. **Pentre-**  
**mitidea ? leda**.
- Granatocrinus lotoblastus**, C. A. White, 1875 : v. **Orbitremites ?**  
**lotoblastus**.
- Granatocrinus magnibasis**, R. R. Rowley, 1895 : v. **Orbitre-**  
**mites ? magnibasis**.
- Granatocrinus mccoysi**, R. Etheridge fil. & P. H. Carpenter, 1886 :  
v. **Orbitremites mccoysi**.
- Granatocrinus melo**, B. F. Shumard, 1866 : v. **Cryptoblastus**  
**melo**.
- Granatocrinus melo**, var. **projectus** (Meek & Worthen): B. F.  
Shumard, 1866 : v. **Cryptoblastus ? projectus**.
- Granatocrinus melonoides**, F. B. Meek & A. H. Worthen, 1869 :  
v. **Schizoblastus melonoides**.
- Granatocrinus missouriensis**, B. F. Shumard, 1866 : v. **Schizo-**  
**blastus ? missouriensis**.
- Granatocrinus mutabilis**, R. R. Rowley, 1893 : v. **Orbitremites**  
**mutabilis**.
- Ganatocrinus neglectus**, F. B. Meek & A. H. Worthen, 1869 :  
v. **Schizoblastus ? neglectus**.
- Granatocrinus neglectus**, C. R. Keyes, 1894 : v. **Cryptoblastus ?**  
**projectus**.
- Granatocrinus norwoodi** (Owen & Shumard): B. F. Shumard,  
1866 : v. **Orbitremites norwoodi**.
- Granatocrinus norwoodi**, var. **fimbriatus** (Meek & Worthen): R.  
Etheridge fil. & P. H. Carpenter, 1886 : v. **Orbitremites nor-**  
**woodi**, var. **fimbriatus**.

**Granatocrinus oblongus**, said by R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 186, 187, to have been used by them in 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239; but no such name occurs there. In any case they make it a syn. of *Mesoblastus elongatus* (Cumberland) and *Mesoblastus sowerbii*, Eth. & Carp. (qq. v.).

**Granatocrinus orbicularis** (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orbitremites orbicularis**.

**Granatocrinus pisiformis**, R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orbitremites campanulatus**.

**Granatocrinus pisum**, F. B. Meek & A. H. Worthen, 1869: v. **Cryptoblastus pisum**.

**Granatocrinus projectus** (Meek & Worthen); F. B. Meek & A. H. Worthen, 1866: v. **Cryptoblastus? projectus**.

**Granatocrinus pyriformis**, R. R. Rowley & S. J. Hare, 1891: v. **Orbitremites piriformis**.

**Granatocrinus roemeri** (Shumard): B. F. Shumard, 1866: v. **Orbitremites? roemeri**.

**Granatocrinus rofei**, R. Etheridge fil. & P. H. Carpenter, 1882: v. **Schizoblastus rofei**.

**Granatocrinus sayi** (Shumard): B. F. Shumard, 1866: v. **Schizoblastus sayi**.

**Granatocrinus shumardi**, F. B. Meek & A. H. Worthen, 1866: v. **Schizoblastus? shumardi**.

**Granatocrinus sphæroidalis**, S. A. Miller & W. F. E. Gurley, 1893: v. **Orbitremites sphæroidalis**.

**Granatocrinus? wachsmuthi**, R. Etheridge fil., 1892: v. **Orbitremites? wachsmuthi**.

**Granatocrinus winslowi**, S. A. Miller & W. F. E. Gurley, 1893: v. **Orbitremites winslowi**.

**HETEROBLASTUS**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 255. Type-species—*H. cumberlandi*.

**Heteroblastus? cornutus**. *Pentremites cornutus*, F. B. Meek & A. H. Worthen, 1861, Proc. Acad. Nat. Sci. Philadelphia, 1861, p. 141. *Elva-crinus cornutus* (Meek & Worthen): B. F. Shumard, 1863, Trans. Acad. Sci. St. Louis, ii, p. 112. *Granatocrinus cornutus* (Meek & Worthen): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 375; and F. B.



Meek & A. H. Worthen, 1866, Rep. Geol. Surv. Illinois, ii, p. 276, pl. xx, f. 1. *Heteroblastus? cornutus* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 256.

**Heteroblastus cumberlandi**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 257, pl. vi, ff. 1-6.

*Heteroblastus cumberlandi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 256, 257.  $\mathcal{T}$ . Lower Carboniferous, Yoredale Shales: Gunnerton Burn, Hexham, Northumberland, England. [E. 665.] Six fragments, not figured, but forming part of type-material.

*Heteroblastus cumberlandi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 256, 257, pl. vi, f. 4.  $\mathcal{T}$ . Lower Carboniferous, Yoredale Shales: Gunnerton Burn, Hexham, Northumberland, England. [E. 8075.] Presented by P. H. Carpenter. A deltoïd, part of type-material.

*Heteroblastus cumberlandi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 256, 257, pl. vi, f. 5.  $\mathcal{T}$ . Lower Carboniferous, Yoredale Shales: Gunnerton Burn, Hexham, Northumberland, England. [E. 8076.] Presented by P. H. Carpenter. Anal deltoïd, part of type-material.

*Heteroblastus cumberlandi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 257, pl. vi, f. 6.  $\mathcal{T}$ . Lower Carboniferous (Yoredale Shales): Gunnerton Burn, Hexham, Northumberland, England. [E. 8077.] Presented by P. H. Carpenter. A radial, part of type-material.

**HETEROSCHISMA**, C. Wachsmuth, 1883, Rep. Geol. Surv. Illinois, vii, p. 352. Type-species—*H. gracile*. Made syn. of **Codaster**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 33, 263.

**Heteroschisma alternatum** (Lyon): C. Wachsmuth, 1883: v. **Codaster alternatus**.

**Heteroschisma alternatum**, var. **elongatum**, C. Wachsmuth, 1883: v. **Codaster alternatus**, var. **elongatus**.

**Heteroschisma gracile**, C. Wachsmuth, 1883: v. **Codaster gracilis**.

**MESOBLASTUS**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 181. Type-species—*M. crenulatus*.

**Mesoblastus angulatus**. *Pentatrematites angulata*, G. B. Sowerby, July 1828, Zool. Journ. iv, p. 89; and 1834, Zool. Journ. v, Suppl.-pl. xxxiii, f. 1. *Pentremites angulatus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 13. *Orbitremites angulatus?* (Gilb.): T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111. *Mesoblastus*

[**Mesoblastus angulatus**, continued.]

*angulatus* (Sowerby): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 185; here also they quote *Granatocrinus angulatus* as having been used by them in 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239, but the name is not to be found there.

*Pentatrematites angulatus*, G. B. Sowerby, 1828, Zool. Journ. iv, p. 89; and 1834, Zool. Journ. v, p. 457, Suppl.-pl. xxxiii, f. 1, *a* (& ? *b*).

☉. *Pentremites angulatus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 13. Lower Carboniferous, Carboniferous Limestone: "Calamine mines belonging to the Duke of Buccleugh, near Whitwell, in Bowland, on the Lancashire side of the Odder," England. [E. 8131.] Gilbertson Coll., No. 81.

*Mesoblastus angulatus* (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 104, 185, pl. vi, f. 7. Lower Carboniferous, Carboniferous Limestone: Calamine mines, Bolland, Lancashire, England (as E. 8131). [E. 8040.] Gilbertson Coll. A theca.

*Mesoblastus angulatus* (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 15, 30, 185, pl. viii, ff. 7 & 8. Lower Carboniferous, Carboniferous Limestone: Calamine mines, Bolland, Lancashire, England (as E. 8131). [E. 8041.] Gilbertson Coll. A large but weathered theca.

*Mesoblastus angulatus* (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 46, 185, pl. xvii, f. 9. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 1047.] Presented by J. Rofe. Micro-section and two parts of the specimen from which it was cut.

**Mesoblastus ? australis**, R. Etheridge fil., 1892, in R. Etheridge & R. L. Jack, Geol. & Palæont. Queensland, p. 210, pl. xlv, f. 2.

**Mesoblastus crenulatus.** *Pentatrematites crenulatus*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 366, pl. vii, ff. 15 *a-d*. *Pentremites crenulatus*, Roemer: L. G. de Koninck & H. Le Hon, 1854, Mém. Acad. Roy. Belg. xxviii (3), p. 199, pl. vii, ff. 4 *a-d*. *Mesoblastus crenulatus* (Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 183.

*Mesoblastus crenulatus* (C. F. Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 61, 104, 183, pl. iv, ff. 1, 2. Lower Carboniferous, Upper Carboniferous Shale: Tournay, Belgium. [E. 8101.] De Koninck Coll. A theca, which, with all the other specimens from de Koninck, probably formed part of the original type-material.

*Mesoblastus crenulatus* (C. F. Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 58, 183, pl. vi, f. 8. Lower Carboniferous, Upper Carboniferous Shale: Tournay, Belgium. [E. 8102.] De Koninck Coll. A theca.

*Mesoblastus crenulatus* (C. F. Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 15, 183, pl. vi, f. 9.

Lower Carboniferous, Upper Carboniferous Shale : Tournay, Belgium.  
[E. 8103.] De Koninck Coll. A theca.

*Mesoblastus crenulatus* (C. F. Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 49, 183, pl. vi, f. 10.  
Lower Carboniferous, Upper Carboniferous Shale; Tournay, Belgium.  
[E. 8104.] De Koninck Coll. A theca.

— Lower Carboniferous, Upper Carboniferous Shale; Tournay, Belgium.

[57006.] De Koninck Coll. Twenty thecas, some cut.

[E. 8001.] One theca.

[E. 84.] J. Morris Coll. An imperfect theca registered as  
“*Granatocrinus ellipticus*, Bolland.”

**Mesoblastus elongatus.** *Mitra elongata*, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 35, pl. A [not B], ff. 1–3 (2nd row). *Pentatremitites oblonga*, G. B. Sowerby, 1828, Zool. Journ. iv, p. 90; and 1835, v, Suppl.-pl. xxxiii, ff. 3 & 4 (var.). *Pentremites oblongus*, “Gilb.”: J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, ff. 11, 12. *Orbitremites oblongus* (Gilb.): T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111. *Granatocrinus elongatus* (Phill.): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239. *Mesoblastus elongatus* (Cumberland): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 186.

*Mesoblastus elongatus* (Cumberland): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 92, 186, pl. xvii, f. 10. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 1051.] Micro-section and specimen from which it was cut.

*Pentremites oblongus*, “Gilb.”: J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 11, & ? f. 12. *Mesoblastus elongatus* (Cumberland): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 15, 61, 104, 186, pl. vi, f. 11, & pl. viii, ff. 1–4. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 8038.] Gilbertson Coll. A perfect theca.

— Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 8037.] Theca ground at top and bottom.

**Mesoblastus elongatus**, R. Etheridge & P. H. Carpenter, 1886, errore pro **Mesoblastus sowerbyi** (q. v. sub E. 780 & E. 8039).

**Mesoblastus giganteus**, nom. nud., R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 140, 183, 189. [This has never been described, and the proposed type-specimen, which should be in the Manchester Museum, could not be found by the curator, 14 June, 1897.]

**Mesoblastus ? glaber.** *Granatocrinus glaber*, F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 91; and 1873, Rep. Geol. Surv. Illinois, v, p. 537, pl. xx, f. 11. *Schizoblastus glaber* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 246. *Mesoblastus ? glaber* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 183.

**Mesoblastus rofei.** *Acentrotremites* sp., R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 233. *Mesoblastus rofei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 188.

"*Acentrotremites* . . . fragment . . . collected in Derbyshire by the late Mr. Rofe." R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 233. *Mesoblastus rofei*, "Clitheroe, Lancashire," R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 49, 188, 235, pl. iv, ff. 3, 4.  $\mathcal{T}$ . Lower Carboniferous, Carboniferous Limestone: England<sup>1</sup>. [E. 783.] Presented by J. Rofe. A mutilated theca.

**Mesoblastus?** *shumardi* (Meek & Worthen), Etheridge & Carpenter, 1886: v. **Schizoblastus?** *shumardi*.

**Mesoblastus sowerbyi.** *Granatocrinus elongatus* (pars), R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239 (non Cumberland). *Mesoblastus sowerbii*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 187; also on pp. 49, 50, 187, erroneously as *Mesoblastus elongatus*.

*Mesoblastus sowerbii*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 15, 60, 104, 187, pl. vi, ff. 12-14, pl. viii, ff. 5, 6 (also erroneously as *Mesoblastus elongatus* on p. 49).  $\mathcal{T}$ . Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 780.] Gilbertson Coll. A fairly preserved theca.

*Mesoblastus elongatus*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 50, 187, pl. xi, f. 15. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 8039.] Gilbertson Coll. A theca really belonging to *M. sowerbyi*.

**METABLASTUS**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 196. Type-species—*M. lineatus*.

**Metablastus bipyramidalis.** *Pentremites bipyramidalis*, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2), p. 607, pl. xv, f. 2. *Troostocrinus bipyramidalis* (Hall): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 384, footnote. *Metablastus bipyramidalis* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 200.

**Metablastus cottaldi.** *Belemnocrinus cottaldi*, E. Munier-Chalmas, 1876, Journ. Conchyl. (3) xvi, p. 105. *Belocrinus cottaldi* (Mun.-Chalmas): E. Munier-Chalmas, 1881, Bull. Soc. géol. France (3) ix, p. 503. *Troostocrinus* vel *Pentremitidea cottaldi* (Mun.-Chalmas): R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 245. *Metablastus cottaldi* (Mun.-Chalmas): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 201, pl. v, f. 22.

<sup>1</sup> The Registers throw no light on the discrepancy between the two quotations from Etheridge & Carpenter.



*Metablastus cottaldi* (E. Munier-Chalmas): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 202, 203. Lower Devonian, Grès de Gahard: Bois Roux, commune de Gahard (Ille-et-Vilaine), France. [E. 661.] Presented by P. H. Carpenter. Two fragments.

**Metablastus hispanicus.** *Troostocrinus hispanicus*, R. Etheridge fil. & P. H. Carpenter, April 1883, Ann. Mag. Nat. Hist. (5) xi, p. 245. *Metablastus hispanicus* (Eth. & Carp.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 200.

*Troostocrinus hispanicus*, R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 245.  $\mathcal{T}$ . *Metablastus hispanicus* (Eth. & Carp.): R. Etheridge<sup>3</sup> fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 200, pl. v, f. 21. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 664.] A theca presumed to be the type, although 23.5 mm. high instead of 25 mm. as stated.

**Metablastus lineatus.** *Pentremites lineatus*, B. F. Shumard, 1858, Trans. Acad. Sci. St. Louis, i, p. 241, pl. ix, ff. 3 a, b. *Troostocrinus lineatus* (Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 384, footnote. *Troostocrinus lineatus* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, pp. 247-249. *Metablastus lineatus* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 199, pl. iii, ff. 14, 15, pl. xvii, f. 18.

— Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 826.] Wachsmuth Coll. Four thecas, one of them crushed and one fragmentary in matrix.

— Lower Carboniferous, [Upper] Burlington Limestone: Sagetown, Illinois, U.S.A. [E. 8167.] T. A. Worthen Coll. A complete, but rather crushed, theca.

**Metablastus ? pentalobus.** *Codaster pentalobus*, J. Hall, 1882, Rep. Geol. Surv. Indiana, xi (1881), p. 280, pl. xv, f. 16. *Metablastus ? pentalobus* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 198. *Stephanocrinus pentalobus* (Hall): S. A. Miller, 1889, N. Amer. Geol. & Palæont. p. 283; but this not accepted by C. Wachsmuth & F. Springer in [privately printed] Index to Revision of Palæocrinoidea.

**Metablastus ? subcylindricus.** *Pentremites subcylindrica*, J. Hall & R. P. Whitfield, 1875, Rep. Geol. Surv. Ohio, ii (2), p. 129, pl. vi, f. 13. *Metablastus ? subcylindricus* (Hall & Whitfield): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 198. *Troostocrinus subcylindricus* (Hall & Whitfield): S. A. Miller, 1889, N. Amer. Geol. & Palæont. p. 287.

**Metablastus varsouviensis.** *Pentremites (Tricelocrinus) varsouviensis*, A. H. Worthen, 1875, Rep. Geol. Surv. Illinois, vi, p. 521,

[**Metablastus varsouviensis**, continued.]

pl. xxxi, ff. 8, 9. *Metablastus varsouviensis* (Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 198. Syn. of *Metablastus wortheni* (Hall): C. R. Keyes, 1894, Rep. Geol. Surv. Missouri, iv, p. 137.

— Lower Carboniferous, Warsaw beds: Monroe Co., Illinois, U.S.A. [E. 8168.] T. A. Worthen Coll. A good theca.

**Metablastus wachsmuthi.** *Troostocrinus wachsmuthi*, W. F. E. Gurley, 25 Feb. 1884, New Carb. Foss., Bull. No. 2, p. 1 [Danville, Ill.]. *Metablastus wachsmuthi* (Gurley): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 198.

**Metablastus wortheni.** *Pentremites wortheni*, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2), p. 606, pl. xv, f. 1. *Troostocrinus wortheni* (Hall): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 384, footnote. *Metablastus wortheni* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 198.

— Lower Carboniferous, Keokuk Group: Keokuk, Iowa, U.S.A. [E. 8169.] T. A. Worthen Coll. Three crushed thecas of various sizes.

**Metablastus sp.** R. Etheridge fil. & P. H. Carpenter, 1886: v. **Tricelocrinus? leei.**

**MITRA**, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 31. Type-species—*M. vera*. (Preoccupied by G. Humphrey, 1797, for a Gastropod): v. **Orophocrinus.**

**Mitra depressa**, G. Cumberland, 1826: v. **Orophocrinus pentangularis.**

**Mitra elliptica**, G. Cumberland, 1826: v. **Acentrotremites ellipticus.**

**Mitra elongata**, G. Cumberland, 1826: v. **Mesoblastus elongatus.**

**Mitra hibernica**, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 34, pl. B (not A), ff. 1-4 (bottom group). *Granatocrinus* [= *Orbitremites*] ? sp. ?, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 243.

**Mitra humerostellata**, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 35, pl. A (not B), ff. 1-3 (third row). *Granatocrinus* [= *Orbitremites*] ? sp. ?, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 243.

**Mitra rugoso, quinque perforata**, G. Cumberland, 1826: v. **Pentremites godoni.**

**Mitra vera**, G. Cumberland, 1826: v. **Orophocrinus verus.**

**NUCLEOCRINUS**, T. A. Conrad, 1842, Journ. Acad. Nat. Sci. Philadelphia, viii, p. 280. *Olivanites*, nom. nud., G. Troost, 1849, Amer. Journ. Sci. viii, p. 419. *Elæacrinus*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 375. *Nucleocrinus* (Conrad): J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. pp. 144-146. *Elæacrinus* (Roemer); R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 210. Type-species—*N. elegans*.

***Nucleocrinus angularis***. *Olivanites angularis*, S. S. Lyon, 1857, Rep. Geol. Surv. Kentucky, iii, p. 492, pl. v, ff. 2, 2 a, 2 b. *Nucleocrinus angularis* (Lyon): S. S. Lyon & S. A. Casseday, 1859, Proc. Amer. Assoc. Adv. Sci. iv, p. 295. *Elæacrinus angularis* (Lyon): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 368. *Elæacrinus angularis* (Lyon): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 219.

*Elæacrinus angularis* (S. S. Lyon): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 219, pl. ii, ff. 43, 44. Lower Devonian, Corniferous Limestone: Loc.?, U.S.A. [E. 827.] A theca in matrix. The figures not very exact.

—? Middle Devonian, Upper Hamilton Group: Cementville, Clark Co., Indiana, U.S.A. [E. 8176.] T. A. Worthen Coll. Small theca, perhaps young, attached to matrix.

***Nucleocrinus canadensis***, H. Montgomery, 1881: v. ***Nucleocrinus elegans***.

***Nucleocrinus conradi***, or young of *N. verneuili*, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 149. *Elæacrinus conradi* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 218. Perhaps distinct "from all other species of the genus."

***Nucleocrinus elegans***, T. A. Conrad, 1842, Journ. Acad. Nat. Sci. Philadelphia, viii, p. 280, pl. xv, f. 17. *Nucleocrinus hallii*, L. Vanuxem, 1842, Geol. Surv. Third District N.Y. p. 163. *Nucleocrinus elegans*, Conrad: J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 147. *Elæacrinus elegans* (Conrad): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 369. *Nucleocrinus canadensis*, H. Montgomery, 30 Dec. 1881, Canad. Nat. & Geol. (n. s.) x, p. 83. *Elæacrinus elegans* (Conrad), and *Elæacrinus canadensis* (Montgomery) vel *E. lucina* var. *canadensis*: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 216, 218, pl. xviii, f. 19.

*Nucleocrinus lucina*, J. Hall (?): H. Montgomery, Dec. 30, 1881, Canad. Nat. & Geol. (n. s.) x, p. 81, f. 1 a, b, c; and *Nucleocrinus canadensis*, op. cit. p. 83.  $\mathcal{T}$ . Middle Devonian, Hamilton Group: Limestone Quarry near Thedford (= Widder), Bosanquet township, Lambton Co., Ontario, Canada. [E. 7990.]

***Nucleocrinus greenei***, S. A. Miller & W. F. E. Gurley, Dec. 1893, Bull. Illinois Mus. iii, p. 62, pl. vi, ff. 24, 25.

**Nucleocrinus hallii**, L. Vanuxem, 1842: v. **Nucleocrinus elegans**.

**Nucleocrinus lucina**, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 148, pl. i, f. 16. *Elæacrinus lucina* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 216.

— Middle Devonian, Hamilton Group: New Buffalo, Iowa, U.S.A. [E. 8175.] T. A. Worthen Coll. A theca.

**Nucleocrinus lucina** (Hall): H. Montgomery, 1881: v. **Nucleocrinus elegans**.

**Nucleocrinus lucina**, var. **canadensis** (Montgomery): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Nucleocrinus elegans**.

**Nucleocrinus meloniformis**. *Elæacrinus meloniformis*, W. H. Barris, 1883, Rep. Geol. Surv. Illinois, vii, p. 361.

**Nucleocrinus obovatus**. *Elæacrinus obovatus*, W. H. Barris, 1883, Rep. Geol. Surv. Illinois, vii, p. 358.

*Elæacrinus* sp., "may possibly belong to *E. obovatus*. Barris": R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 219. Devonian: N. America. [E. 822.] An anal interradius, undoubtedly of this species.

— Middle Devonian, Hamilton Group: Alpena, Michigan, U.S.A. [E. 1826.] Wachsmuth & Springer Coll. A perfect theca.

**Nucleocrinus venustus**, S. A. Miller & W. F. E. Gurley, Dec. 1893, Bull. Illinois Mus. iii, p. 63, pl. vi, ff. 26-30.

**Nucleocrinus verneuili**. *Pentremites verneuili*, G. Troost, 1841, 6th Geol. Rep. State Tennessee, p. 14. *Pentremites verneuili*, Troost: A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i, p. 102. *Olivanites verneuili*, nom. nud., G. Troost, 1849, Amer. Journ. Sci. viii, p. 419. *Elæacrinus verneuili* (Troost): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 379, pl. viii, f. 1. *Nucleocrinus verneuili* (Troost): S. S. Lyon & S. A. Casseday, 1859, Proc. Amer. Acad. iv, p. 295. *Elæacrinus verneuili* (Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 216. See also *Nucleocrinus conradi* and *Pentremites carioides*.

*Elæacrinus verneuili* (Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 35, 56, 74, 216, pl. xviii, f. 16, and most probably ff. 17, 18. Lower Devonian, Corniferous Limestone: Falls of the Ohio, Kentucky, U.S.A. [E. 20.] J. Tennant Coll. A theca.

— Lower Devonian, Corniferous Limestone: Louisville, Kentucky, U.S.A. [E. 819.] J. Morris coll. Two good thecas, one weathered theca, and a piece of a test. The two former are said to be figured in R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pl. xviii, ff. 17, 18; but see under E. 20.

*Elæacrinus verneuili* (Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 215, 218, pl. xvii, f. 19. Lower



Devonian, Corniferous Limestone: Columbus, Ohio, U.S.A. [E. 659a.] Presented by H. A. Nicholson. A micro-section and the two halves of the theca from which it was cut.

— Lower Devonian, Corniferous Limestone: Columbus, Ohio, U.S.A. [E. 659.] Presented by H. A. Nicholson. A theca in matrix.

— Lower Devonian, Corniferous Limestone: Louisville, Kentucky, U.S.A. [E. 818.] Presented by J. Brown. A damaged theca.

— Lower Devonian, Upper Helderberg: Clarke Co., Indiana, U.S.A. [E. 820.] Two thecas, rather obscured by matrix.

— Lower Devonian, Corniferous Limestone: Falls of the Ohio, U.S.A. [E. 8174.] T. A. Worthen Coll. ex S. S. Lyon Coll. Three well-preserved thecas, one in chert.

**Nucleocrinus verneuili**, var. *pomum*. *Elæacrinus verneuili*, var. *pomum*, "may represent *Olivanites globosus*, Troost": R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 218, 219, pl. ii, f. 46.

*Elæacrinus verneuili*, var. *pomum*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 219.  $\mathcal{T}$ . Lower Devonian, Corniferous Limestone: Columbus, Ohio, U.S.A. [E. 660.] Presented by H. A. Nicholson. A theca, part of the type-material.

*Elæacrinus verneuili*, var. *pomum*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 219.  $\mathcal{T}$ . Lower Devonian, Corniferous Limestone: Clarke Co., Indiana, U.S.A. [E. 821.] Two thecas, part of the type-material.

**OLIVANITES**, G. Troost, 1849: v. **Nucleocrinus**.

**Olivanites angularis**, S. S. Lyon, 1857: v. **Nucleocrinus angularis**.

**Olivanites globosus**, nom. nud., G. Troost, 1849, Amer. Journ. Sci. (2) viii, p. 419; and 1850, Proc. Amer. Assoc. Adv. Sci. 1849, p. 62. Referred to *Elæacrinus verneuili* by C. F. Roemer, 1852, Lethæa Geogn., 3 Aufl. ii Theil, p. 284; and B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 369: v. **Nucleocrinus verneuili**, var. *pomum*.

**Olivanites verneuili** (Troost): G. Troost, 1849: v. **Nucleocrinus verneuili**.

**ORBITREMITES**.<sup>1</sup> *Orbitremites*, nom. nud., J. E. Gray, 1840, Synopsis of the Contents of the British Museum, 42nd Edition, p. 63. *Orbitremites*, T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111.

<sup>1</sup> The type-species of *Granatocrinites*, Troost, is *G. cidariformis*, which also is nomen nudum. The type-species of *Granatocrinus*, Hall, is *Pentremites granulatus*, Roemer, of which the structure is still quite unknown. The type-species of *Granatocrinus*, Eth. & Carp., is *Pentremites norwoodi*, Owen & Shumard. All of these must yield to *Orbitremites*, the meaning of which was fixed by T. & T. Austin's use of it in 1842.

[**Orbitremites**, continued.]

- [?] *Granatocrinites*, nom. nud., G. Troost, 1849, Amer. Journ. Sci. (2) viii, p. 420; and 1850, Proc. Amer. Assoc. Adv. Sci. 1850, p. 62.  
 [?] *Granatocrinus*, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 146. *Granatocrinus* (Hall): emend. R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 236; and 1886, Cat. Blastoidea Brit. Mus. p. 238. Type-species—*O. derbiensis*.

**Orbitremites angulatus** ? (Gilb.): T. & T. Austin, 1842: v. **Mesoblastus angulatus**.**Orbitremites aplatatus**. *Granatocrinus aplatatus*, R. R. Rowley & S. J. Hare, Aug. 1891, Kansas City Scientist, v, p. 117, pl. iii, ff. 11, 12.**Orbitremites campanulatus**. *Pentremites campanulatus*, F. McCoy, 1849, Ann. Mag. Nat. Hist. (2) iii, p. 249. *Pentremites campanulatus* (McCoy): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 361, pl. viii, f. 4. *Granatocrinus campanulatus* (McCoy) and *Granatocrinus pisiformis*, nom. nud., R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239. *Granatocrinus campanulatus* (McCoy): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 251.

*Granatocrinus campanulatus* (McCoy): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 15, 25, 251, pl. viii, ff. 13, 14. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 8056.] Gilbertson Coll. A theca.

*Granatocrinus campanulatus* (McCoy): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 251, pl. x, f. 10. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 8057.] Gilbertson Coll. A theca, said to be the figured specimen: if so, the figure is  $\times 9$  and not  $\times 5$ .

*Granatocrinus campanulatus* (McCoy): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 251, pl. ix, f. 8. Lower Carboniferous, Carboniferous Limestone: Lancashire?, England. [E. 8058.] Presented by J. Rofe. A weathered theca.

*Granatocrinus campanulatus* (McCoy): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 252, pl. ix, ff. 9, 10. Lower Carboniferous, Carboniferous Limestone: Lancashire?, England. [E. 8059.] Presented by J. Rofe. A weathered theca.

*Granatocrinus campanulatus* (McCoy): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 241, 252, pl. x, f. 9. Lower Carboniferous, Carboniferous Limestone: Lancashire?, England. [E. 8060.] Presented by J. Rofe. A theca.

——. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 795.] Gilbertson Coll. A very young theca.

——. Lower Carboniferous, Carboniferous Limestone: England. [E. 796.] Presented by J. Rofe. Seven thecas.

**Orbitremites concinnulus.** *Granatocrinus concinnulus*, R. R. Rowley & S. J. Hare, Aug. 1891, Kansas City Scientist, v, p. 117, pl. iii, ff. 13, 14.

**Orbitremites ? curtus.** *Pentremites curtus*, B. F. Shumard, 1855, 1st and 2nd Rep. Geol. Surv. Missouri, pt. ii, p. 187, pl. B, ff. 3 a-b. *Elæocrinus curtus* (Shumard): B. F. Shumard, 1863, Trans. Acad. Sci. St. Louis, ii, p. 112. *Granatocrinus curtus* (Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 375. *Granatocrinus ? curtus* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 248.

**Orbitremites derbiensis.** *Pentremites derbiensis*, G. B. Sowerby, 1825, Zool. Journ. ii, p. 317, pl. xi, f. 3. *Orbitremites derbiensis* (Sow.): T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111. *Pentatrematites derbiensis* (Sow.): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 364. *Granatocrinus derbiensis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239; and 1886, Cat. Blastoidea Brit. Mus. p. 250.

*Pentremites derbiensis*, Sow.: J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 10. Lower Carboniferous, Carboniferous Limestone: England.<sup>1</sup> [E. 8137.] Gilbertson Coll., No. 79. A theca.

*Granatocrinus derbiensis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 250, pl. ix, f. 4. Lower Carboniferous, Carboniferous Limestone: England<sup>1</sup>. [E. 8047.] Gilbertson Coll., No. 79. A small theca; if really the figured specimen, as which it was handed over by the authors, then the figure is magnified 6 diameters and is not much like the original.

*Granatocrinus derbiensis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 9, 250, pl. vi, f. 23. Lower Carboniferous, Carboniferous Limestone: England<sup>1</sup>. [E. 8048.] Gilbertson Coll., No. 79. Theca with two columnals attached.

*Granatocrinus derbiensis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 46, 250, pl. xvii, f. 4. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire,

<sup>1</sup> The locality of the 9 specimens of *Pentremites* (vel *Granatocrinus* vel *Orbitremites*) *derbiensis* from the Gilbertson collection is doubtful. G. B. Sowerby in 1826 said, "Mr. White Watson . . . supposes them [the cotypes] to be peculiar to Derbyshire, and states that they belong to the twenty-sixth bed of limestone." In 1828 G. B. Sowerby quoted Gilbertson as saying of specimens of other species from his collection: "The Pentatrematites are all from the Calamine mines belonging to the Duke of Buccleugh, near Whitwell in Bowland, on the Lancashire side of the Odder." In 1836, J. Phillips gave as localities for this species "Grassington; Derbyshire." The latter name may refer to Sowerby's specimens only; the former, almost certainly, refers to Gilbertson's, or at least to some of them. Gilbertson's MS. list and the Register of the Zoological Department (41.6.18.116-125) say nothing as to the locality; but, when transferred to the Geological Department, the specimens were registered as from "Bolland." Etheridge & Carpenter, in 1886, alluded to one of the Gilbertson specimens (pl. vi, f. 23) as from "Lancashire." Grassington, which seems the most probable locality, is in the West Riding of Yorkshire, 10 miles N. of Skipton. Calamine and lead mines are worked in the Carboniferous Limestone there.

[*Orbitremites derbiensis*, continued.]

- England. [E. 8046.] Presented by J. Rofe. A micro-section and two halves of the specimen from which it was cut.
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 15, 250, pl. ix, ff. 2, 3. Lower Carboniferous, Carboniferous Limestone: England. [E. 8049.] Presented by J. Rofe. A theca taken as the figured specimen on the evidence of the authors' own label, but which does not agree with the figures in diameter or state of preservation.
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 49, 92, 250, pl. xi, ff. 12, 13. Lower Carboniferous, Carboniferous Limestone: England. [E. 8050.] Presented by J. Rofe. A weathered theca (not two specimens).
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 49, 92, 250, pl. xi, f. 11. Lower Carboniferous, Carboniferous Limestone: England. [E. 8051.] Presented by J. Rofe. A weathered and imperfect theca.
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 250, pl. ix, f. 5. Lower Carboniferous, Carboniferous Limestone: England. [E. 8052.] Presented by J. Rofe. A rather worn theca.
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 57, 250, pl. ix, f. 7. Lower Carboniferous, Carboniferous Limestone: England. [E. 8053.] Presented by J. Rofe. Taken as the figured specimen on the evidence of the authors' own label; but the reference is more than doubtful.
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 29, 250 (not 125), pl. ix, f. 1. Lower Carboniferous, Carboniferous Limestone: Derbyshire [according to the Register, not Lancashire as in "Catalogue"], England. [E. 8054.] J. Tennant Coll. A theca.
- Granatocrinus derbiensis* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 29, 250, pl. ix, f. 6. Lower Carboniferous, Carboniferous Limestone: Derbyshire, England. [E. 8055.] J. Tennant Coll. A theca.
- Lower Carboniferous, Carboniferous Limestone: Derbyshire, England. [E. 19.] J. Tennant Coll. Twenty-two thecas.
- Lower Carboniferous, Carboniferous Limestone: Lancashire, England. [E. 286.] Egerton Coll. Three weathered thecas.
- Lower Carboniferous, Carboniferous Limestone: (see footnote i, p. 25), England. [E. 800.] Gilbertson Coll., No. 79. Six thecas "all weathered, but the best that can be got," Gilb. MS.
- Lower Carboniferous, Carboniferous Limestone: England. [E. 801.] Five weathered thecas.
- [E. 803.] Presented by J. Rofe. Three weathered thecas, one cut in half.
- ? Lower Carboniferous, Carboniferous Limestone: Lancashire, England. [E. 802.] A weathered theca.



- Orbitremites ellipticus.** *Pentremites elliptica*, G. B. Sowerby, 1825, Zool. Journ. ii, p. 317, pl. xi, f. 4. *Orbitremites ellipticus* (Sow.): T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111. *Pentatrematites ellipticus* (Sow.): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 360. *Pentremites ellipticus*, Sow.: J. Rofe, 1865, Geol. Mag. (1) ii, p. 249, pl. viii, f. 7. *Granatocrinus ellipticus* (Phill.): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239; and 1886, Cat. Blastoidea Brit. Mus. p. 253.
- Pentremites ellipticus*, Sow.: J. Rofe, 1865, Geol. Mag. (1) ii, p. 249, pl. viii, f. 7. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 1049.] Presented by J. Rofe. Micro-section and cross-section of a theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 46, 253, pl. xvii, f. 6. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 1048 a.] Presented by J. Rofe. Micro-section.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 92, 253, pl. xvii, f. 7. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 1048 b.] Presented by J. Rofe. Micro-section.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 50, 253, pl. x, f. 13. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8064.] Weathered cross-section of a theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 49, 50, 253, pl. x, f. 14. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8065.] Weathered theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 48, 49, 253, pl. x, f. 12. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8066.] A theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 51, 253, pl. x, f. 15. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8067.] A theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 241, 253, pl. x, f. 16. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8068.] A young individual.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 255, pl. vi, f. 21. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8069.] A theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 25, 107, 253, pl. viii, ff. 16, 17. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8070.] A theca.
- Granatocrinus ellipticus* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 15, 253, pl. viii, f. 18. Lower

[*Orbitremites ellipticus*, continued.]

Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8071.] A theca in matrix: if the figured specimen, as stated by the authors, then the figure is restored.

*Granatocrinus ellipticus* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 25, 29, 253, pl. viii, f. 19. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8072.] Theca in matrix, figure restored and incorrect.

*Granatocrinus ellipticus* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 50, 253, pl. viii, f. 20. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8073.] Theca with weathered radial sinus.

*Granatocrinus ellipticus* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 60, 253, pl. viii, f. 21. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8074.] Half a theca.

——. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 807.] Gilbertson Coll., No. 77. Eighteen thecas, some worn, some only halves. According to Gilbertson's MS. Catalogue, this lot includes specimens figured by G. B. Sowerby & J. Phillips as *Pentremites ellipticus*; but closer determination is impossible.

*Pentremites ellipticus*. "Elongated variety of *P. ellipticus* [sic]," G. B. Sowerby, 1828, Zool. Journ. iv, p. 91. Lower Carboniferous, Carboniferous Limestone: Calamine mines of Duke of Buccleugh, near Whitwell, in Bolland, Lancashire. [E. 8133.] Gilbertson Coll., No. 77 a. Theca with adherent matrix.

——. Lower Carboniferous, Carboniferous Limestone: Calamine mines of Duke of Buccleugh, near Whitwell in Bolland, Lancashire, England.

[E. 806.] Gilbertson Coll. Three imperfect but large thecas.

[E. 8132.] Gilbertson Coll., No. 77 b. Theca "with supposed columnar fragments in matrix," Gilb. MS.

[E. 8134.] Gilbertson Coll. Theca in matrix.

——. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 808.] Presented by J. Rofe. Fifty-eight thecas and fragments.

——. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 1048.] Presented by J. Rofe. Cross-section of theca.

——. Lower Carboniferous, Carboniferous Limestone: Lancashire, England.

[E. 287.] Egerton Coll. Two medium-sized and one young theca.

[E. 804.] Four thecas.

——. Lower Carboniferous, Carboniferous Limestone: England.

[E. 805.] Mantell Coll. Two imperfect thecas.

[E. 809.] Presented by J. Rofe. Three half-thecas, polished on cut side.

- Orbitremites excavatus.** *Granatocrinus excavatus*, R. R. Rowley & S. J. Hare, July 1891, Kansas City Scientist, v, p. 99, pl. ii, ff. 9, 10.
- Orbitremites exiguus.** *Granatocrinus exiguus*, R. R. Rowley & S. J. Hare, July 1891, Kansas City Scientist, v, p. 100, pl. ii, ff. 13, 14; and p. 118, pl. iii, f. 18.  
— Lower Carboniferous, Lower Burlington Limestone: Louisiana, Missouri, U.S.A. [E. 8002.] R. R. Rowley coll. Damaged theca in chert.
- Orbitremites fimbriatus.** *Granatocrinus fimbriatus*, F. B. Meek & A. H. Worthen, 1866, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 259. *Granatocrinus norwoodi*, var. *fimbriatus*, Meek & Worthen: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 248.
- Orbitremites globosus**, nom. nud., T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111. Not known to R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 243.
- Orbitremites ? granulatus.** *Granatocrinites cidariformis*, nom. nud., G. Troost, 1849, Amer. Journ. Sci. (2) viii, p. 420 (*vide* Shumard). *Pentrematites granulatus*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), pp. 363, 364. *Granatocrinus granulatus* (Roemer): J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 146. *Granatocrinus granulatus* (Roemer): B. F. Shumard, 1866, Trans. Acad. Nat. Sci. St. Louis, ii, p. 375. *Granatocrinus ? granulatus* (Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 244.
- Orbitremites leda** (J. Hall): (sub **Granatocrinus**), J. F. Whiteaves, 1887: v. **Pentremitidea ? leda**.
- Orbitremites ? lotoblastus.** *Granatocrinus lotoblastus*, C. A. White, 1875, Rep. Wheeler's Surv. W. of 100th Meridian, iv, p. 80. *Pentremites lotoblastus* (White): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 242. *Granatocrinus ?*, *Schizoblastus ?*, vel *Elæocrinus ? lotoblastus* (White): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 231, 232.
- Orbitremites mccoysi.** *Granatocrinus m'coyi*, nom. nud., R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239. *Granatocrinus mccoysi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 252, pl. viii, f. 12, & pl. x, ff. 5-8.  
*Granatocrinus mccoysi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 241, 252, pl. viii, f. 12, pl. x, ff. 5, 6.  
⊕ Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8061.] Presented by J. Rofe. A well-preserved theca, one of two type-specimens.  
*Granatocrinus mccoysi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 106, 241, 252, pl. x, ff. 7, 8. ⊕ Lower

[**Orbitremites maccoyi** continued.]

Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8062.] Presented by J. Rofe. A theca, one of two type-specimens.

——. Lower Carboniferous, Carboniferous Limestone: ? Clitheroe, Lancashire, England. [E. 797.] Presented by J. Rofe. Two thecas.

**Orbitremites magnibasis.** *Granatocrinus* (*Schizoblastus*?) *magnibasis*, R. R. Rowley, Oct. 1895, Amer. Geol. xvi, p. 220, ff. 11–14.

**Orbitremites mutabilis.** *Granatocrinus mutabilis*, R. R. Rowley, Nov. 1893, Amer. Geol. xii, p. 306, pl. xiv, ff. 4–9.

**Orbitremites norwoodi.** *Pentremites norwoodi*, D. D. Owen & B. F. Shumard, 1850, Journ. Acad. Nat. Sci. Philadelphia (2) ii, p. 64, pl. vii, f. 13. *Elæocrinus norwoodi* (Owen & Shumard): B. F. Shumard, 1863, Trans. Acad. Nat. Sci. St. Louis, ii, p. 112. *Granatocrinus*? *norwoodi* (Owen & Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 375. *Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239; and 1886, Cat. Blastoidea Brit. Mus. p. 245.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 46, 245, pl. xvii, f. 8. Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 1058.] Transverse micro-section.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 245, pl. ii, f. 32. Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 8083.] Saemann Coll. A wide theca.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 245, pl. ii, f. 33. Lower Carboniferous, Upper Burlington Limestone: Pleasant Grove, Iowa, U.S.A. [E. 8084.] C. Wachsmuth Coll. A theca.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 245, pl. ii, f. 34. Lower Carboniferous, Upper Burlington Limestone: Pleasant Grove, Iowa, U.S.A. [E. 8085.] C. Wachsmuth Coll. A theca.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 205, pl. ii, f. 35. Lower Carboniferous, Upper Burlington Limestone: Pleasant Grove, Iowa, U.S.A. [E. 8086.] C. Wachsmuth Coll. A theca.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 245, pl. vii, ff. 5, 6. Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 8087.] C. Wachsmuth Coll. A theca.

*Granatocrinus norwoodi* (Owen & Shumard): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 57, 245, pl. xi, f. 14. Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 8088.] L. Saemann Coll. A theca.

——. Lower Carboniferous, Upper Burlington Limestone: Pleasant



- Grove, Iowa, U.S.A. [E. 810.] C. Wachsmuth Coll. Thirty-three thecas and fragments, one specimen with four thecas on matrix.
- Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A.  
 [E. 811.] C. Wachsmuth Coll. Four internal casts in chert, and eleven thecas showing cross-sections of hydrospires.
- [E. 812.] L. Saemann Coll. Ten whole and five parts of thecas.
- [E. 8181.] T. A. Worthen Coll. ex G. T. Nealley Coll. Two thecas.
- Lower Carboniferous, Upper Burlington Limestone: Louisiana, Missouri, U.S.A. [E. 8003.] R. R. Rowley Coll. Two internal casts in chert.
- Lower Carboniferous, Upper Burlington Limestone (chert):  
 Loc. unknown; ? Burlington, Iowa, U.S.A.  
 [E. 8182.] T. A. Worthen Coll. ex G. T. Nealley Coll. An internal cast.
- [E. 8183.] T. A. Worthen Coll. ex Brewster Coll. A large internal cast.

**Orbitremites norwoodi**, var. **fimbriatus**. *Granatocrinus fimbriatus*, F. B. Meek & A. H. Worthen, 1866, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 259. "Only a well-marked variety of *Granatocrinus norwoodi*." R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 248.

**Orbitremites oblongus** ("Gilb."), T. & T. Austin, 1842: v. **Mesoblastus elongatus**.

**Orbitremites orbicularis**. *Pentatrematites orbicularis*, G. B. Sowerby, 1834, Zool. Journ. v, p. 456, Suppl.-pl. xxxiii, f. 5. *Pentremites orbicularis*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 9. *Granatocrinus orbicularis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 239; and 1886, Cat. Blastoidea Brit. Mus. p. 248.

*Pentatrematites orbicularis*, G. B. Sowerby, 1834, Zool. Journ. v, p. 456, Suppl.-pl. xxxiii, f. 5, left-hand.  $\mathcal{T}$ . *Pentremites orbicularis*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 9. *Granatocrinus orbicularis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 249, pl. ix, ff. 11, 13, 16. *Orbitremites orbicularis* (Sow.): F. A. Bather, 1899, in E. Ray Lankester's Zoology, Cap. Blastoidea, f. xv, 3, 4. Lower Carboniferous, Carboniferous Limestone: Calamine mines of the Duke of Buccleugh, near Whitwell in Bolland, Lancashire, England. [E. 8135.] Gilbertson Coll., No. 78. A theca; one of two type-specimens.

*Pentatrematites orbicularis*, G. B. Sowerby, 1834, Zool. Journ. v, p. 456, Suppl.-pl. xxxiii, f. 5, right-hand.  $\mathcal{T}$ . Lower Carboniferous, Carboniferous Limestone: Calamine mines, Bolland, Lancashire, England. [E. 8136.] Gilbertson Coll., No. 78. A theca, one of two type-specimens.



[**Orbitremites orbicularis**, continued.]

*Granatocrinus orbicularis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 92, 248, pl. xvii, f. 5. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire. [E. 1050.] Presented by J. Rofe. A micro-section, and the two halves of the theca from which it was cut.

*Granatocrinus orbicularis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 107, 248, pl. ix, f. 15. Lower Carboniferous, Carboniferous Limestone: Yorkshire, England. [E. 8044.] Presented by J. Rofe. A well-preserved theca.

*Granatocrinus orbicularis* (Sow.): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 25, 107, 248, pl. ix, ff. 12, 14. Lower Carboniferous, Carboniferous Limestone: Yorkshire, England. [E. 8045.] Presented by J. Rofe. A fairly preserved theca.

— Lower Carboniferous, Carboniferous Limestone: Calamine mines near Whitwell in Bolland, Lancashire, England. [E. 798.] Gilbertson Coll., No. 78. Four imperfect thecas.

— Lower Carboniferous, Carboniferous Limestone: England. [E. 799.] Presented by J. Rofe. Twelve thecas.

**Orbitremites piriformis.** *Granatocrinus pyriformis*, R. R. Rowley & S. J. Hare, Aug. 1891, Kansas City Scientist, v, p. 118, pl. iii, ff. 15, 16.

**Orbitremites ? roemeri.** *Pentremites roemeri*, B. F. Shumard, 1855, 2nd Geol. Rep. Missouri, pt. ii, p. 186, pl. B, f. 2a (non 2, b, c, d, v. *Schizoblastus ? missouriensis*). *Granatocrinus roemeri* (Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 376. *Granatocrinus ? roemeri* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 244. *Schizoblastus ? roemeri* (Shumard): C. R. Keyes, 1894, Rep. Geol. Surv. Missouri, iv, p. 137.

**Orbitremites sphæroidalis.** *Granatocrinus sphæroidalis*, S. A. Miller & W. F. E. Gurley, Dec. 1893, Bull. Illinois Mus. iii, p. 65, pl. vi, ff. 31, 32, 33.

**Orbitremites ? wachsmuthi.** *Granatocrinus ? wachsmuthii*, R. Etheridge fil., 1892, in R. Etheridge & R. L. Jack, Geol. and Palæont. Queensland, p. 211, pl. vii, f. 10.

**Orbitremites winslowi.** *Granatocrinus winslowi*, S. A. Miller & W. F. E. Gurley, Dec. 1893, Bull. Illinois Mus. iii, p. 66, pl. vi, ff. 34, 35.

**Orbitremites sp.** Lower Carboniferous, Carboniferous Limestone, Yorkshire, England. [E. 8000.] Presented by J. Rofe. An imperfect theca.

**OROPHOCRINUS.** *Mitra*, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 31 (preocc. Humphrey, 1797, for a mollusc). *Dimorphicrinus*, A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i, p. 155 (v. **Dimorphicrinus**). *Orophocrinus*, K. von Seebach, 1864, Nachr. Ges. Wiss.

Göttingen, 1864, p. 110. *Codonites*, F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 84, footnote; and 1873, Rep. Geol. Surv. Illinois, v, p. 463. *Orophocrinus*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 249; and 1886, Cat. Blastoidea Brit. Mus. p. 283. Type-species—*O. stelliformis*

**Orophocrinus conicus**, C. Wachsmuth & F. Springer, 1890: v. **Orophocrinus whitei**.

**Orophocrinus fusiformis**. *Codonites fusiformis*, nom. nud., S. A. Miller, 1889, N. Amer. Geol. & Palæont. p. 233. *Orophocrinus fusiformis*, C. Wachsmuth & F. Springer, 1890, Rep. Geol. Surv. Illinois, viii, p. 203, pl. xvii, f. 4.

*Orophocrinus fusiformis*, Wachsmuth & Springer: F. A. Bather, 1897, Guide to Fossil Invertebrates . . . in Brit. Mus. (Nat. Hist.), p. 101, f. 157. Lower Carboniferous, Kinderhook group: Iowa, U.S.A. [E. 1726.] C. Wachsmuth & F. Springer Coll. A crown attached to specimen of *Cactocrinus nodobrachiatus*, forms basis of the reconstructed figure.

— Lower Carboniferous, Kinderhook Group: Le Grand, Iowa, U.S.A. [E. 8173.] T. A. Worthen Coll. A perfect crown.

**Orophocrinus gracilis**. *Codonites gracilis*, F. B. Meek & A. H. Worthen, 1873, Rep. Geol. Surv. Illinois, v, p. 467, pl. viii, f. 6. *Orophocrinus gracilis* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 287.

**Orophocrinus inflatus** (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orophocrinus verus**.

**Orophocrinus inopinatus**. *Codonites inopinatus*, R. R. Rowley & S. J. Hare, July 1891, Kansas City Scientist, v, pp. 100, 118, pl. ii, ff. 11, 12, & pl. iii, f. 17.

**Orophocrinus orbignyianus**. *Pentremites orbignyianus*, L. G. de Koninck, 1842, Descr. animaux foss. terr. carb. Belg. p. 37, pl. E, ff. 4, a, b, c. *Pentatrematites pailleti*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 359 (non de Verneuil). *Pentremites orbignyianus*, de Kon.: L. G. de Koninck & H. Le Hon, 1854, Mém. Acad. Roy. Belg. xxviii (3), p. 200, pl. vii, ff. 5 a-d. *Orophocrinus orbignyianus* (de Kon.): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 252; and 1886, Cat. Blastoidea Brit. Mus. p. 287.

**Orophocrinus pentangularis**. *Platycrinites pentangularis*, J. S. Miller, 1821, Nat. Hist. Crin. p. 83, pl. facing p. 81, bottom compartment, ff. 2, 5, 6, 7. *Mitra depressa*, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 32, pl. B [not A, as in text], f. 3. *Pentatrematites pentangularis* (Miller): G. B. Sowerby, 1834, Zool. Journ. v, p. 457, Suppl.-pl. xxxiii, f. 7. *Pentremites pentangularis* ("Gilb."): J. Phillips, 1836, Geol. Yorksh. ii, p. 207. *Pentremites pentangularis*, "Gilb. Phillips," and *Dimorphocrinus pentangularis* (Miller): A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i,

[**Orophocrinus pentangularis**, continued.]

p. 155. *Pentremites* "*pentagonalis*, Sow.": J. Morris, 1854, Cat. Brit. Foss., 2nd Ed., p. 86. *Pentremites waterhousianus*, L. G. de Koninck & H. Le Hon, 1854, Mém. Acad. Roy. Belg. xxviii (3), p. 203, pl. vii, ff. 6 a-c. *Pentremites waterhousei*, J. Rofe, 1865, Geol. Mag. (1) ii, p. 250. *Orophocrinus pentangularis* (Miller) & *O. waterhousianus* (De Kon. & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 252. *Orophocrinus* (*Pentremites*) *praelongus* (pars), W. H. Baily, 1886, Sci. Proc. Roy. Dublin Soc. (n. s.) v, p. 31, pl. i, ff. 2, 2 a, 2 b (non ff. 1, 1 a). *Orophocrinus pentangularis* (Miller): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 229.

*Pentatremitis pentangularis* (J. S. Miller): G. B. Sowerby, 1834, Zool. Journ. v, p. 457, Suppl.-pl. xxxiii, f. 7. *Pentremites pentangularis* ("Gilb."): J. Phillips, 1836, Geol. Yorksh. ii, p. 207. Lower Carboniferous, Carboniferous Limestone: [Probably from Calamine mines near Whitewell in] Bolland, Lancashire, England. [E. 843.] Gilbertson Coll., No. 76. A theca.

*Orophocrinus pentangularis* (J. S. Miller): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 90, 292, pl. xvii, f. 14. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 1054.] Presented by J. Rofe. Micro-section and the theca from which it was cut.

*Orophocrinus pentangularis* (J. S. Miller): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 90, 292, pl. xv, ff. 5, 6. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8080.] Presented by J. Rofe. An imperfect theca.

*Orophocrinus pentangularis* (J. S. Miller): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 61, 292, pl. xv, f. 7. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 8081.] Presented by J. Rofe. A theca.

*Pentremites waterhousianus*, L. G. de Koninck & H. Le Hon, 1854, Mém. Acad. Roy. Belg. xxviii (3), p. 203, pl. vii, ff. 6 a-c.  $\mathcal{T}$ . *Orophocrinus waterhousianus* (De Kon. & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 252. *Orophocrinus pentangularis* (J. S. Miller): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 16, 47, 90, 293, pl. xv, ff. 8, 9, 10, pl. xvi, ff. 8, 9; also as *Orophocrinus pentangularis* (Miller), var. *waterhousianus* (de Kon.), in explanation of plates. Lower Carboniferous, Upper Carboniferous Shale: Tournay, Belgium. [E. 845.] De Koninck Coll. An abnormal theca.

— Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 844.] Presented by J. Rofe. Two thecas.

**Orophocrinus pentangularis** (Miller), var. **waterhousianus** (De Kon. & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Orophocrinus pentangularis** [E. 845].

**Orophocrinus prælongus.** *Orophocrinus (Pentremites) prælongus*, W. H. Baily, Jan. 1886, Sci. Proc. R. Dublin Soc. (n. s.) v, p. 31, pl. i, ff. 1, 1 a (non ff. 2, 2 a, 2 b).

**Orophocrinus (Pentremites) prælongus**, W. H. Baily, 1886 (op. cit. ult. ff. 2, 2 a, 2 b): v. **Orophocrinus pentangularis**.

**Orophocrinus puzos.** *Pentremites puzos*, G. von Münster, 1839, Beiträge zur Petrefaktenkunde, Heft i, p. 1, pl. i, ff. 5, a-d. *Pentatrematites puzos* (Münster): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 356. *Orophocrinus puzos* (Münster): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 252; and 1886, Cat. Blastoidea Brit. Mus. p. 287.

**Orophocrinus? sirius.** *Pentremites sirius*, C. A. White, 1862, Proc. Boston Soc. Nat. Hist. ix (2), p. 20, f. 3; and 1863, Boston Journ. Nat. Hist. vii, p. 486. *Orophocrinus? ? sirius* (White): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 287, footnote.

**Orophocrinus stelliformis.** *Pentremites stelliformis*, D. D. Owen & B. F. Shumard, 1850, Journ. Acad. Nat. Sci. Philadelphia, (n. s.) ii, p. 67, pl. vii, ff. 16 a, b. *Orophocrinus stellæformis* (Owen & Shumard): K. von Seebach, March 1864, Nachr. Ges. Wiss. Göttingen, 1864, p. 10. *Codaster stelliformis* (Owen & Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 359. *Codonites stelliformis* (Owen & Shumard): F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 84, footnote. *Orophocrinus stelliformis* (Owen & Shumard): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 252; and 1886, Cat. Blastoidea Brit. Mus. p. 287.

*Orophocrinus stelliformis* (Owen & Shumard): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 91, 287, pl. xvii, f. 12. Lower Carboniferous, Lower Burlington Limestone: Burlington, Iowa, U.S.A. [E. 1055.] Two micro-sections and the two halves of the theca from which they were cut.

— Lower Carboniferous, Lower Burlington Limestone: Burlington, Iowa, U.S.A.

[E. 840.] C. Wachsmuth Coll. Five thecas, 2 ground on the top, and 3 fragmentary.

[E. 841.] L. Saemann Coll. Two good thecas.

[E. 8172.] T. A. Worthen Coll. ex C. Wachsmuth Coll. One rather small theca, and one larger in matrix.

**Orophocrinus stelliformis, var. campanulatus.** *Codonites campanulatus*, G. Hambach, 1884, Trans. Acad. Sci. St. Louis, iv, p. 553, pl. D, ff. 8, 9. *Orophocrinus stelliformis, var. campanulatus* (Hambach): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 289.

*Orophocrinus stelliformis, var. campanulatus* (Hambach): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 20, 289,



[**Orophocrinus stelliformis**, var. **campanulatus**, continued.]

pl. xvi, f. 5. Lower Carboniferous, Lower Burlington Limestone: Burlington, Iowa, U.S.A. [E. 842 a.] C. Wachsmuth Coll. One theca.

— Lower Carboniferous, Lower Burlington Limestone: Burlington, Iowa, U.S.A. [E. 842 b.] C. Wachsmuth Coll. One theca.

**Orophocrinus verus**. *Mitra vera*, G. Cumberland, 1826, Reliquiæ Conservatæ, p. 31, pl. B [not A, as in text], ff. 1, 2. *Pentatrematites inflata*, G. B. Sowerby, 1828, Zool. Journ. iv, p. 90; and 1834, Zool. Journ. v, p. 457, Suppl.-pl. xxxiii, f. 2. *Pentremites inflatus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, ff. 1, 2, 3. *Orophocrinus inflatus* (Sow.): R. Etheridge fl. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 252. *Orophocrinus verus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 290.

*Pentatrematites inflata*, G. B. Sowerby, 1828, Zool. Journ. iv, p. 90; and 1834, Zool. Journ. Suppl.-pl. xxxiii, f. 2 (upper fig.).  $\mathcal{T}$ . *Pentremites inflatus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 3. Lower Carboniferous, Carboniferous Limestone: Calamine mines of Duke of Buccleugh, near Whitwell, in Bolland, Lancashire, England. [E. 8138.] Gilbertson Coll. A theca.

*Pentatrematites inflata*, G. B. Sowerby, 1834, Zool. Journ. v, p. 457, Suppl.-pl. xxxiii, f. 2 (lower fig.). *Pentremites inflatus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, f. 1. *Orophocrinus verus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 97, 291, pl. xv, f. 3. Lower Carboniferous, Carboniferous Limestone: Calamine mines of Duke of Buccleugh, near Whitwell, in Bolland, Lancashire, England. [E. 8139.] Gilbertson Coll. A theca.

*Pentremites inflatus* (Sow.): J. Rofe, 1865, Geol. Mag. (1) ii, p. 250, pl. viii, f. 9. *Orophocrinus verus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 46, 290, pl. xvii, f. 13. Lower Carboniferous, Carboniferous Limestone: Clitheroe, Lancashire, England. [E. 849.] Presented by J. Rofe. A theca in two halves.

*Orophocrinus verus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 47, 290, pl. xv, f. 4. Lower Carboniferous, Carboniferous Limestone: Preston, Lancashire, England. [E. 847.] Bean Coll. A theca.

*Orophocrinus verus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 97, 290, pl. xii, f. 9. Lower Carboniferous, Carboniferous Limestone: Lancashire, England. [E. 848.] A theca ground down from above.

*Orophocrinus verus* (Cumberland): R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 97, 286, 290, pl. xv, f. 1; and [?] pl. xvi, f. 10. Lower Carboniferous, Carboniferous Limestone: Whitwell, Bolland, Lancashire, England. [E. 8078.] Presented by J. Rofe. A theca; if pl. xvi, f. 10 be, as the authors say, taken from this specimen, then the figure is much restored.



- Orophocrinus verus* (Cumberland): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 97, 290, pl. xv, f. 2. Lower Carboniferous, Carboniferous Limestone: Whitwell, Bolland, Lancashire, England. [E. 8079.] Presented by J. Rofe. A theca.
- . Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 82.] J. Morris Coll. Two crushed thecas.
- . Lower Carboniferous, Carboniferous Limestone: Lancashire, England. [E. 285.] Egerton Coll. One theca.
- . Lower Carboniferous, Carboniferous Limestone: Calamine mines of Duke of Buccleugh, near Whitwell, in Bolland, Lancashire, England. [E. 846.] Gilbertson Coll. A very large theca with imperfect base, and a smaller, much worn theca.
- . Lower Carboniferous, Carboniferous Limestone: Whitwell, Bolland, Lancashire, England. [E. 808.] Presented by J. Rofe. Two thecas.

**Orophocrinus waterhousianus** (de Kon. & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Orophocrinus pentangularis**.

**Orophocrinus whitei**. *Codaster whitei*, J. Hall, 1861, Boston Journ. Nat. Hist. vii, p. 327. *Codaster? whitei* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 266. *Codonites conicus*, nom. nud., S. A. Miller, 1889, N. Amer. Geol. & Palæont. p. 233. *Orophocrinus conicus*, C. Wachsmuth & F. Springer, 1890, Rep. Geol. Surv. Illinois, viii, p. 201, pl. xv, ff. 1-3. *Orophocrinus whitei* (Hall): R. P. Whitfield, 1893, Mem. Amer. Mus. Nat. Hist. i, p. 36, pl. iii, ff. 25-28.

**PENTATREMATITES**, G. B. Sowerby, 1828, emendatio pro **Pentremites** (q. v.).

**Pentatrematites acuta**, G. B. Sowerby, 1834: v. **Phænoschisma acutum**.

**Pentatrematites angulatus**, G. B. Sowerby, 1828: v. **Mesoblastus angulatus**.

**Pentatrematites campanulatus** (McCoy): C. F. Roemer, 1851: v. **Orbitremites campanulatus**.

**Pentatrematites crenulatus**, C. F. Roemer, 1851: v. **Mesoblastus crenulatus**.

**Pentatrematites derbiensis** (G. B. Sowerby): C. F. Roemer, 1851: v. **Orbitremites derbiensis**.

**Pentatrematites eifeliensis**, C. F. Roemer, 1855: v. **Pentremitidea eifelensis**.

**Pentatremites ellipticus** (G. B. Sow.): C. F. Roemer, 1851: v. **Orbitremites ellipticus**.

**Pentatremites florealis** (Schlotheim): C. F. Roemer, 1851: v. **Pentremites godoni**.

**Pentatremites gracilis**, J. Steininger, 1849: v. **Pentremitidea ? gracilis**.

**Pentatremites granulatus**, C. F. Roemer, 1851: v. **Orbitremites ? granulatus**.

**Pentatremites inflata**, G. B. Sowerby, 1828: v. **Orophocrinus verus**.

**Pentatremites obliquatus**, C. F. Roemer, 1851: v. **Tricelocrinus obliquatus**.

**Pentatremites oblonga**, G. B. Sowerby, 1828: v. **Mesoblastus elongatus**.

**Pentatremites orbicularis**, G. B. Sowerby, 1834: v. **Orbitremites orbicularis**.

**Pentatremites orbignyanus?**, C. F. Roemer, 1851 (non de Koninck): v. **Phænoschisma caryophyllum**.

**Pentatremites ovalis** (Goldfuss): C. F. Roemer, 1851: v. **Pentremites ? ovalis**.

**Pentatremites pailleti** (de Verneuil): C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 368, pl. vii, ff. 17 *a-c*: v. **Pentremitidea paillettei**.

**Pentatremites pailleti**, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 369, "aus dem devonischen Kalke der Eifel" (non de Verneuil): v. **Pentremitidea eifelensis**.

**Pentatremites pailleti**, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 359 (non pp. 368, 369, de Verneuil): v. **Orophocrinus orbignyanus**.

**Pentatremites pentangularis** (J. S. Miller): G. B. Sowerby, 1834: v. **Orophocrinus pentangularis**.

**Pentatremites planus**, G. & F. Sandberger, 1856: v. **Pentremitidea plana**.

**Pentatremites puzos** (Münster): C. F. Roemer, 1851: v. **Orophocrinus puzos**.

**Pentatrematites pyriformis** (Say) : C. F. Roemer, 1851 : v. **Pentremites piriformis**.

**Pentatrematites reinwardtii** (Troost) : C. F. Roemer, 1851 : v. **Troostocrinus reinwardti**.

**Pentatrematites schultzii** (d'Archiac & de Verneuil) : C. F. Roemer, 1851 : v. **Cryptoschisma schulzi**.

**Pentatrematites sulcatus**, C. F. Roemer, 1851 : v. **Pentremites sulcatus**.

**PENTATREMITES**, H. G. Bronn, 1860 ; occasionally used instead of **Pentremites** (q. v.).

**PENTEPHYLLUM**, S. Haughton, 1859, Journ. Geol. Soc. Dublin, viii, p. 183, pl. xxix. Type-species—*P. adarensis*.

**Pentephyllum adarensis**, S. Haughton, 1859, Journ. Geol. Soc. Dublin, viii, p. 183, pl. xxix. R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 296, pl. xvi, ff. 14–16.

— . Two plaster-casts of the type-specimen. Lower Carboniferous, Carboniferous Limestone : Adare, Limerick, Ireland. [E. 71.]

**PENTREMITE**, T. Say, 1820 : v. **Pentremites**.

**Pentremite florealis** (E. F. von Schlotheim) : T. Say, 1825 : v. **Pentremites godoni**.

**Pentremite globosa**, T. Say, 1825 : v. **Pentremites? globosus**.

**Pentremite pyriformis**, T. Say, 1825 : v. **Pentremites piriiformis**.

**PENTREMITES**. *Pentremite*, T. Say, 1820, Amer. Journ. Sci. ii, p. 36 ; and 1825, Journ. Acad. Nat. Sci. Philadelphia, iv, p. 292 : reprinted 1825, Zool. Journ. ii, p. 313. *Pentremites* (pars), G. B. Sowerby, 1825, Zool. Journ. ii, p. 316. *Pentatrematites* (pars), G. B. Sowerby, 1828, Zool. Journ. iv, p. 89. *Pentatremites*, H. G. Bronn, 1860, Klassen und Ordn. Thier-Reichs, ii, p. 189. *Pentremites*, Say : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 150. Type-species—*P. godoni*.

**Pentremites abbreviatus**, G. Hambach, 1880 : v. **Pentremites godoni**, var. **abbreviatus**.

**Pentremites acutangulus**, L. Schultze, 1867 : v. **Pentremitidea acutangula**.

**Pentremites acutus**, "Gilb." : J. Phillips, 1836 : v. **Phænoschisma acutum**.

**Pentremites angularis**, S. S. Lyon, 1860, Trans. Acad. Sci. St. Louis, i, p. 631, pl. xx, ff. 3 a-c. *Pentremites angularis*, Lyon: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 156.

— Lower Carboniferous, Chester Group: Chester, Illinois, U.S.A. [E. 8154.] T. A. Worthen Coll. Two thecas, one with peristomial covering-plates.

**Pentremites angulatus**, "Gilb.": J. Phillips, 1836: v. **Mesoblastus angulatus**.

**Pentremites ? astraformis**, nom. nud., T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 111: v. **Codaster trilobatus**, var. **acutus**.

**Pentremites basilaris**, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 159, pl. B, f. 9. *Pentremites basilaris*, Hambach: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 166.

**Pentremites bipyramidalis**, J. Hall, 1858: v. **Metablastus bipyramidalis**.

**Pentremites bradleyi**, F. B. Meek, 1873, 6th Ann. Rep. Geol. Surv. Territories, for 1872, p. 470, and footnote.

**Pentremites broadheadi**, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 159, pl. B, f. 6.

**Pentremites burlingtonensis**, F. B. Meek & A. H. Worthen, 1870, Proc. Acad. Nat. Sci. Philadelphia, 1870, p. 33; and 1873, Rep. Geol. Surv. Illinois, v, p. 461, pl. viii, f. 7. *Pentremites burlingtonensis*, Meek & Worthen: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 156.

*Pentremites godoni* (Defrance): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 103, 157, pl. i, f. 11. Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 762.] C. Wachsmuth Coll. A theca identified as *P. burlingtonensis* by C. Wachsmuth, who held the type-specimen. It was registered and labelled as *P. burlingtonensis* by one of the authors of the "Catalogue." It comes from the horizon of *P. burlingtonensis*, a horizon from which *P. godoni* has not yet been recorded. And it agrees with the diagnosis of *P. burlingtonensis*.

— Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 763.] C. Wachsmuth Coll. A theca which, though purchased in August 1874, was not catalogued by R. Etheridge fil. & P. H. Carpenter, 1886.

**Pentremites ? calyce**. *Pentremites calyce*, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N. Y. p. 150. "Genus indet.," R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 138.

**Pentremites calycinus**, S. S. Lyon, 1860, Trans. Acad. Sci. St. Louis, i, p. 628, pl. xx, ff. 1 *a-c* (see under *Pentremites elegans*?, E. 8159 & E. 8160).

**Pentremites campanulatus**, F. McCoy, 1849: v. **Orbitremites campanulatus**.

**Pentremites carioides**, D. D. Owen, 1843, Cat. Geol. Spec. Ohio Valley, *vide* B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 369, who made it syn. of *Elæacrinus* [= *Nucleocrinus*] *verneuili*.

**Pentremites caryophyllatus**, L. G. de Koninck & H. Le Hon, 1854: v. **Phænoschisma caryophyllatum**.

**Pentremites cervinus**, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2), p. 690, pl. xxv, ff. 11 *a, b*. *Pentremites cervinus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 166.

**Pentremites cherokeeus**, nom. nud., G. Troost, 1850, Proc. Amer. Assoc. 1849, p. 60. Considered a syn. of *P. sulcatus*, Roemer: J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2), p. 691, pl. xxv, ff. 12 *a, b*; and B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 385; but correctness of this identification doubted by R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 166.

**Pentremites chesterensis**. *Pentremites chesteriensis*, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 158, pl. B, f. 8. *Pentremites chesteriensis*, Hambach: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 144.

**Pentremites clavatus**, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 157, pl. B, f. 5 (non Schultze, 1867). *Troostocrinus*? *clavatus* (Hambach): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 249. *Pentremites clavatus*, Hambach: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 199.

**Pentremites clavatus**, L. Schultze, 1867: v. **Pentremitidea clavata**.

**Pentremites conoideus**, J. Hall, 1856, Trans. Albany Inst. iv, p. 5; and 1858, Rep. Geol. Surv. Iowa, i (2), p. 655, pl. xxii, ff. 8-10. *Pentremites koninckana*, J. Hall, 1856, Trans. Albany Inst. iv, p. 4; and 1858, Rep. Geol. Surv. Iowa, i (2), p. 656, pl. xxii, ff. 11 *a-c*. *Pentremites sulcatus*, K. A. Zittel (non Roemer), 1879, Handb. d. Palæont. i, p. 432, f. 305 *a*. *Pentremites conoideus*, Hall (including *P. koninckana*): R. P. Whitfield, 1882, Bull. Amer. Mus. Nat. Hist. i (3), p. 44. *Pentremites conoideus* and var. *koninckanus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 162.

*Pentremites conoideus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 46, 162, pl. xviii, f. 6. Lower



[**Pentremites conoideus**, continued.]

- Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 1056 *a.*] Micro-section showing hydrospires.
- Pentremites conoideus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 163, pl. ii, f. 16. Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 8112.] One theca.
- Pentremites conoideus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 95, 162, pl. iii, f. 4. Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 8113.] Theca with wall partly broken away.
- Pentremites conoideus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 95, 162, pl. iii, ff. 5 & 6. Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 8114.] A radial showing hydrospires.
- Pentremites conoideus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 163, pl. ii, f. 17. Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 8115.] A theca.
- Pentremites conoideus*, Hall, var. *koninckanus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 163, pl. ii, ff. 18, 19, 21, 22, 23. Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 8116.] Five thecas, said to be the figured specimens; if so, the figures are slightly larger than natural size.
- Pentremites conoideus*, Hall, var. *koninckanus*, Hall: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 94, 95, pl. iii, ff. 7, 8, 9. Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A. [E. 8117.] A theca in three fragments, showing interior.
- Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A.  
 [E. 773.] Fourteen thecas, some cut across, and three radials showing hydrospires.  
 [E. 774.] C. Wachsmuth Coll. Twenty-nine thecas in chert, many of them hollow.  
 [E. 1056, *b.*] Micro-section showing hydrospires.  
 [E. 1056, *c.*] Transverse micro-section of theca.
- Lower Carboniferous, St. Louis Group, Warsaw Limestone: Salem, Indiana, U.S.A. [E. 7994.] C. S. Beachler Coll.; presented by F. A. Bather. Four thecas.
- Lower Carboniferous, St. Louis Group, Warsaw Limestone: Monroe Co., Illinois, U.S.A. [E. 8165.] T. A. Worthen Coll. Three thecas.
- Lower Carboniferous, St. Louis Group, Warsaw Limestone: Spergen Hill, Indiana, U.S.A.  
 [E. 775.] C. Wachsmuth Coll. Eighty-two thecas in chert, many hollow; including several young (= var. *koninckanus*).  
 [E. 776.] Twelve young thecas (= var. *koninckanus*).  
 [E. 777.] Thirty-two young thecas (= var. *koninckanus*).

- Pentremites conoideus**, J. Hall, var. **koninckanus**, J. Hall: R. Etheridge fil. & P. H. Carpenter, 1886: v. **Pentremites conoideus**.
- Pentremites cornutus**, F. B. Meek & A. H. Worthen, 1860: v. **Heteroblastus? cornutus**.
- Pentremites crenulatus** (C. F. Roemer): L. G. de Koninck & H. Le Hon, 1854: v. **Mesoblastus crenulatus**.
- Pentremites curtus**, B. F. Shumard, 1855: v. **Orbitremites? curtus**.
- Pentremites? decussatus**. *Pentremites decussatus*, B. F. Shumard, 1858, Trans. Acad. Sci. St. Louis, i, p. 242, pl. ix, ff. 6 a, b; and 1866, *op. cit.* ii, p. 383. "Genus indet.": R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 143.
- Pentremites derbiensis**, G. B. Sowerby, 1825: v. **Orbitremites derbiensis**.
- Pentremites dutertrii**, errore pro *Pentremites paillettei*, C. F. Roemer, 1851: v. **Pentremitidea paillettei**.
- Pentremites eifeliensis**, C. F. Roemer: L. Schultze, 1867: v. **Pentremitidea eifelensis**.
- Pentremites eifeliensis** (pars), L. Schultze, 1867 (non Roemer): v. **Pentremitidea roemeri**.
- Pentremites elegans**, S. S. Lyon, 1860, Trans. Acad. Sci. St. Louis, i, p. 632, pl. xx, ff. 4 a-c. *Pentremites elegans*, Lyon: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 156, & ? pl. v, f. 27.
- Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 60, 167, pl. i, f. 3. Lower Carboniferous, Chester Group: Alabama, U.S.A. [75972.] A theca.
- Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 26. Lower Carboniferous, Chester Group: (? Huntsville, Alabama) U.S.A. [E. 8106.] A theca, handed over by the authors as the figured specimen.
- Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 27. Lower Carboniferous, Chester Group: (? Huntsville, Alabama) U.S.A. [E. 8107.] A theca, handed over by the authors as the figured specimen.
- Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 29. Lower Carboniferous, Chester Group: (? Huntsville, Alabama) U.S.A.

- Pentremites godoni** (Defrance): var. **No. 2** (species proper), R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 159, pl. ii, f. 3. Lower Carboniferous, Chester Group: Huntsville, Alabama, U.S.A. [E. 8119.] A theca.
- Lower Carboniferous, Chester Group: Alleghanies, U.S.A. [75973.] Pearson Coll. Fifteen thecas, of which all except two are on matrix.
- Lower Carboniferous, Chester Group?: Kentucky, U.S.A. [E. 81.] J. Morris Coll. Three thecas.
- Lower Carboniferous, Chester Group: Huntsville, Alabama, U.S.A.  
[E. 743.] Nine thecas in chert.  
[75963.] W. Cunnington Coll. A small piece of Pentremital Limestone, with remains of four specimens of this species and of *P. ? piriformis*.
- Lower Carboniferous, Chester Group: Original label says "Coleonda," probably should be Golconda, Pope Co., Illinois, U.S.A. [E. 744.] Transferred from Museum of Practical Geology. Five thecas on matrix.
- Lower Carboniferous, Chester Group: Floyd Co., Georgia, U.S.A. [E. 745.] Presented by J. Rofe. Three weathered thecas, showing structure, and eleven transected thecas.
- Lower Carboniferous, Chester Group: Leipzig, Pope Co., Illinois, U.S.A. [E. 746.] W. Cunnington Coll. A slab of matrix, "Pentremital Limestone," with about 8 thecas showing.
- Lower Carboniferous, Chester Group: Chester, Illinois, U.S.A. [E. 747.] C. Wachsmuth Coll. A theca showing cross-sections of the hydrospires.  
[E. 755.] C. Wachsmuth Coll. A theca, cut and polished at the top.
- Lower Carboniferous, Chester Group?: Warsaw, Illinois, U.S.A. [E. 1138.] Presented by J. E. Lee. Two poor thecas.
- Lower Carboniferous, Chester Group: Bowling Green, Kentucky, U.S.A. [E. 7993.] Presented by Hugh Kimbley. Eighteen perfect thecas.
- Lower Carboniferous, Chester Group?: U.S.A. [E. 7999.] J. Grenfell Coll. A theca.
- Lower Carboniferous, Chester Group: Henry Co., Indiana, U.S.A. [E. 8008.] Presented by B. B. Woodward. A well-preserved theca.
- Lower Carboniferous, Chester Group: Franklin Co., Tennessee, U.S.A.  
[E. 8142.] T. A. Worthen Coll. A large theca.  
[E. 8143.] T. A. Worthen Coll. A theca of medium size, nearly perfect.
- , var. Lower Carboniferous, Chester Group: Middle Tennessee, U.S.A. [E. 749.] A theca.
- , var. Lower Carboniferous, Chester Group: Mt. Suno, Alabama, U.S.A. [E. 750.] G. Sowerby Coll. Two thecas, one free, one on matrix.

—, var. Lower Carboniferous, Chester Group: Franklin Co., Tennessee, U.S.A. [E. 8127.] Presented by T. Rupert Jones. Ten thecas, of which four are transsected.

**Pentremites godoni** (Defrance): var. **No. 5**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 159, pl. ii, f. 6.

—, Lower Carboniferous, Chester Group?: U.S.A. [E. 7998.] J. G. Grenfell Coll. A theca.

**Pentremites godoni** (Defrance): var. **No. 6**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 159.

*Pentremites godoni* (Defrance): var. No. 6, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 159, pl. ii, f. 5.  
 Ⓒ. Lower Carboniferous: U.S.A. [E. 946.] A rather worn theca, type of var.

**Pentremites godoni** (Defrance): var. **No. 7**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 159.

*Pentremites godoni* (Defrance): var. No. 7, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 159, pl. ii, f. 7.  
 Ⓒ. Lower Carboniferous, Chester Group: Kentucky, U.S.A. [E. 752.] W. Cunnington Coll. A theca, type of var.

**Pentremites godoni** (Defrance), var. **abbreviatus**. *Pentremites abbreviatus*, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 155, pl. B, f. 3. *Pentremites godoni*, var. No. 4 (= *abbreviatus*, Hambach), R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 159, 160.

*Pentremites godoni* (Defrance), var. *abbreviatus*, Hambach: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 160, pl. ii, f. 4. Lower Carboniferous, Chester Group: Chester, Illinois, U.S.A. [E. 669.] Presented by P. H. Carpenter. A theca.

—, —. Lower Carboniferous, Chester Group: Prairie du Long, Illinois, U.S.A. [E. 751.] A theca.

—, —. Lower Carboniferous, ? Chester Group: U.S.A. [E. 7997.] J. G. Grenfell Coll. Two thecas.

**Pentremites godoni**, var. **florealis**. "Asterial Fossil, &c.," J. Parkinson, 1808, Organic Remains, ii, p. 235, pl. xiii, ff. 36, 37. *Encrinites florealis*, E. F. von Schlotheim, 1820, Petrefactenkunde, p. 339. *Pentremites florealis* (Schlotheim), G. A. Goldfuss, 1836, Petrefacta Germaniæ, i, p. 161, pl. 1, ff. 2 a-c. *Pentremites godoni* (Defrance), var. 3, vel var. *florealis* (Schlotheim): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 159, 160.

*Pentremites godoni* (Defrance), var. *florealis* (Schlotheim): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 159, 160, pl. ii, f. 2. Lower Carboniferous, Chester Group: Huntsville, Alabama, U.S.A. [E. 8118.] A theca.



[**Pentremites godoni**, var. **florealis**, continued.]

- , —. Lower Carboniferous, Chester Group: Huntsville, Alabama, U.S.A.  
 [E. 748.] Transferred from Museum of Practical Geology. Five thecas.  
 [E. 1228.] Presented by J. E. Lee. Two thecas.  
 —, —. Lower Carboniferous, ? Chester Group: U.S.A. [E. 7996.]  
 J. G. Grenfell Coll. A theca.

**Pentremites godoni**, var. **major**. *Pentremites godoni* (Defrance): var. No. 1, vel var. *major*: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 159, 160.

*Pentremites godoni* (Defrance): var. *major*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 160, pl. ii, f. 1. **C**. Lower Carboniferous, Chester Group: Franklin Co., Tennessee, U.S.A. [E. 321.] Presented by T. Rupert Jones. A theca, type of var.

*Pentremites godoni* (Defrance): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 101, 157, pl. xii, f. 17. Lower Carboniferous: "Alabama" [?], U.S.A. [E. 772.] Theca, with summit ground. Certainly var. *major*, though not so identified by E. & C.

—, —. Lower Carboniferous, Chester Group: Franklin Co., Tennessee, U.S.A. [E. 753.] Presented by T. Rupert Jones. Two thecas.

—, —. Lower Carboniferous, Chester Group: Mt. Suno, Alabama, U.S.A. [E. 754.] G. Sowerby Coll. Two thecas, one ground on top.

**Pentremites godoni**, pars, R. Etheridge fil. & P. H. Carpenter, 1886 (non Defrance): v. **Pentremites burlingtonensis** [E. 762].

**Pentremites granulatus**, C. F. Roemer, 1851 (sub *Pentatrematites*): v. **Orbitremites? granulatus**.

**Pentremites (Granatocrinus) granulatus**, F. B. Meek & A. H. Worthen, 1865: v. **Schizoblastus? granulatus**.

**Pentremites grosvenori**, B. F. Shumard, 1858: v. **Troostocrinus? grosvenori**.

**Pentremites hemisphericus**, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 157, pl. B, f. 7. *Pentremites hemisphericus*, Hambach: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 156, pl. xvi, f. 21.

**Pentremites inflatus**, "Gilb.": J. Phillips, 1836: v. **Orophocrinus verus**.

**Pentremites inflatus?**, L. G. De Koninck, 1842 (non G. B. Sowerby): v. **Phænoschisma caryophyllatum**.



- Pentremites kentuckyensis**, B. F. Shumard, 1858: v. **Phæno-**  
**schisma? kentuckyense.**
- Pentremites koninckana**, J. Hall, 1856: v. **Pentremites con-**  
**oideus.**
- Pentremites laterniformis**, D. D. Owen & B. F. Shumard, 1850:  
v. **Tricœlocrinus? laterniformis.**
- Pentremites leda**, J. Hall, 1862: v. **Pentremitidea? leda.**
- Pentremites lineatus**, B. F. Shumard, 1858: v. **Metablastus**  
**lineatus.**
- Pentremites longicostalis**, J. Hall, 1859, Rep. Geol. Surv. Iowa, i,  
Supplement, p. 85.
- Pentremites lotoblastus** (C. A. White): R. Etheridge fil. & P. H.  
Carpenter, 1882: v. **Orbitremites? lotoblastus.**
- Pentremites lycorias**, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist.  
N.Y. p. 151. *Pentremites lycorias*, Hall: B. F. Shumard, 1866, Trans.  
Acad. Sci. St. Louis, ii, p. 385. "Genus indet.," R. Etheridge fil. &  
P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 138.
- Pentremites maia**, J. Hall, 1862: v. **Pentremitidea leda**, var.  
**maia.**
- Pentremites melo**, D. D. Owen & B. F. Shumard, 1850: v. **Crypto-**  
**blastus melo.**
- Pentremites melo**, var. **projectus**, F. B. Meek & A. H. Worthen,  
1861: v. **Cryptoblastus? projectus.**
- Pentremites missouriensis** (B. F. Shumard): R. Etheridge fil. &  
P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 223; errore pro  
*Granatocrinus missouriensis*: v. **Schizoblastus? missouriensis.**
- Pentremites missouriensis**, G. C. Swallow, 1863, Trans. Acad. Sci.  
St. Louis, ii, p. 81. *Pentremites missouriensis*, Swallow: R. Etheridge  
fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 144. Syn. of  
*Pentremites sulcatus*, Roemer: C. R. Keyes, 1894, Rep. Geol. Surv.  
Missouri, iv, p. 135.
- Pentremites nodosus**, G. Hambach, 1880, Trans. Acad. Sci. St. Louis,  
iv, p. 155, pl. B, f. 2. *Pentremites nodosus*, Hambach: R. Etheridge  
fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 144.
- Pentremites norwoodi**, D. D. Owen & B. F. Shumard, 1850:  
v. **Orbitremites norwoodi.**

- Pentremites obesus**, S. S. Lyon, 1857, Rep. Geol. Surv. Kentucky, iii, p. 469, pl. ii, ff. 1, 1 *a-e*. *Pentremites obesus*, Lyon: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 167.
- Pentremites obesus*, S. S. Lyon: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 167. Lower Carboniferous, Horizon unknown: U.S.A. [E. 756.] A rather battered theca.
- Lower Carboniferous, Chester Group: Pope Co., Illinois, U.S.A. [E. 8140.] T. A. Worthen Coll. A slightly crushed theca.
- [E. 8141.] T. A. Worthen Coll. Theca devoid of basals and much crushed.
- Pentremites obliquatus** (C. F. Roemer, 1851, as *Pentatrematites*): F. Dujardin & H. Hupé, 1862: v. **Tricelocrinus obliquatus**.
- Pentremites oblongus**, "Gilb.": J. Phillips, 1836: v. **Mesoblastus oblongatus**.
- Pentremites occidentalis**, B. F. Shumard MS. (fide C. F. Roemer, 1851): v. **Tricelocrinus obliquatus**.
- Pentremites orbicularis**, "Gilb.": J. Phillips, 1836: v. **Orbitremites orbicularis**.
- Pentremites orbignyanus**, L. G. de Koninck, 1842: v. **Orophocrinus orbignyanus**.
- Pentremites? ovalis**. *Pentremites ovalis*, G. A. Goldfuss, Petrefacta Germaniæ, 1826, i, p. 161, pl. 1, ff. 1*a-c*. *Pentatrematites ovalis*, Goldfuss: C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 355. *Pentremites? ovalis*, Goldfuss: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 156.
- "**Pentremites ovalis** Say in Silliman Americ. Journ. ii. 36," erroneous reference by C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 355.
- Pentremites ovalis**, J. Phillips, 1841: v. **Pentremitea phillipsi**.
- Pentremites? ovalis**. *Pentremites ovalis*, D. D. Owen, 1843, Catal. Geol. Specimens Ohio Valley, No. 251.
- Pentremites pailletti**, P. E. P. de Verneuil, 1844: v. **Pentremitea paillettei**.
- Pentremites pentagonalis**, E. Forbes, 1848, Mem. Geol. Surv. Gt. Brit. ii. (2), p. 259, f. *a*. Referred by C. F. Roemer, 1851, to *Codaster acutus* (q. v.).
- Pentremites pentagonalis**, J. Morris, 1854: v. **Orophocrinus pentangularis**.

**Pentremites pentangularis**, "Gilb.": J. Phillips, 1836: v. **Orophocrinus pentangularis**.

**Pentremites piriformis**?, v. **Pentremites godoni**, var. **No. 2** [75963].

**Pentremites piriformis.** *Pentremite pyriformis*, T. Say, 1825, Journ. Acad. Nat. Sci. Philadelphia (1) iv, p. 294; and Zool. Journ. ii, p. 314. *Pentatrematites pyriformis*, Say: C. F. Roemer, 1851, Arch. Naturges. xvii (1), p. 354, pl. v, ff. 9 a-c. *Pentremites pyriformis*, Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 167; they include *Pentremites symmetricus*, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2), p. 694, pl. xxv, f. 14.

*Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 60, 167, pl. i, f. 1. Lower Carboniferous, Chester Group: Kentucky, U.S.A. [E. 8097.] W. Cunningham Coll. A theca.

*Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 25. Lower Carboniferous, Chester Group: (? Huntsville, Alabama) U.S.A. [E. 8105.] A theca, handed over by the authors as the figured specimen.

*Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 28. Lower Carboniferous, Chester Group: (? Huntsville, Alabama) U.S.A. [E. 8108.] A theca, handed over by the authors as the figured specimen.

*Pentremites pyriformis*, T. Say: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 30. Lower Carboniferous, Chester Group: (? Huntsville, Alabama) U.S.A. [E. 8110.] A theca handed over by the authors as the figured specimen.

— Lower Carboniferous, Chester Group: Huntsville, Alabama, U.S.A.

[E. 764.] Two weathered thecas on matrix.

[E. 766.] A theca.

— Lower Carboniferous, Chester Group: Alabama, U.S.A. [E. 8129.] Presented by J. N. Pearson. Two thecas, much weathered.

— Lower Carboniferous, Chester Group: Chester, Illinois, U.S.A.

[E. 765.] C. Wachsmuth Coll. Seven cut and polished thecal fragments.

[E. 8149.] T. A. Worthen Coll. Two thecas of typical form.

[E. 8185.] T. A. Worthen Coll. Four-rayed theca, imperfect above.

— Lower Carboniferous, Chester Group: Alleghanies, U.S.A. [E. 768.] Presented by J. N. Pearson. Three thecas on matrix.

[**Pentremites piriformis**, continued.]

- . Lower Carboniferous, Chester Group: Cumberland Mt., Tennessee, U.S.A. [E. 769.] G. Sowerby Coll. A rather imperfect theca.
- . Lower Carboniferous, Chester Group: Bowling Green, Kentucky, U.S.A. [E. 7992.] Presented by Hugh Kimbley. Two well-preserved thecas.
- . Lower Carboniferous, Chester Group: (? Kentucky) U.S.A. [E. 8128.] Two rather weathered thecas.
- . Lower Carboniferous, (? Chester Group): U.S.A. [E. 770.] Presented by J. N. Pearson. A weathered theca with adherent matrix.
- [E. 7995.] J. Grenfell Coll. A good little theca.
- , var. Lower Carboniferous, Chester Group: Chester and Pope Cos., Illinois, U.S.A. [E. 8170.] T. A. Worthen Coll. Three thecas intermediate between typical *P. pyriformis* and var. *symmetricus*.

**Pentremites piriformis**, var. **symmetricus**. *Pentremites symmetricus*, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2) p. 694, pl. xxv, f. 14. *Pentremites pyriformis*, Say, var. *symmetricus*, Hall: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 168, pl. ii, f. 24.

*Pentremites pyriformis*, T. Say, var. *symmetricus*, J. Hall: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 12, 168, pl. ii, f. 24. Lower Carboniferous, Chester Group: U.S.A. [E. 8111.] A theca handed over by the authors as the figured specimen.

— , — . Lower Carboniferous, Chester Group: Huntsville, Alabama, U.S.A. [75964.] Presented by J. N. Pearson. Three thecas.

— , — . Lower Carboniferous, Chester Group: Kentucky, U.S.A. [E. 771.] Two rather weathered thecas, one ground on top.

— , — . Lower Carboniferous, Chester Group: Chester, Illinois, U.S.A.

[E. 8146.] T. A. Worthen Coll. A small theca.

[E. 8147.] T. A. Worthen Coll. A medium-sized theca, with swollen basals.

[E. 8148.] T. A. Worthen Coll. A large well-preserved theca.

**Pentremites potteri**, G. Hambach, 1880: v. **Schizoblastus sayi**.

**Pentremites praelongus**, W. H. Baily, 1886: v. **Orophocrinus praelongus** et **O. pentangularis**.

**Pentremites projectus** (as var. of *P. melo*), F. B. Meek & A. H. Worthen, 1861: v. **Cryptoblastus projectus**.

**Pentremites puzos**, G. von Münster, 1839: v. **Orophocrinus puzos**.

**Pentremites pyriformis**, Say, 1825: v. **Pentremites piriformis**.

**Pentremites pyriformis**, R. Etheridge fl. & P. H. Carpenter, 1886, pars (non Say): v. **Pentremites elegans** [75972, E. 8106, E. 8107, E. 8109].

**Pentremites reinwardtii**, G. Troost, 1835: v. **Troostocrinus reinwardti**.

**Pentremites robustus**, S. S. Lyon, 1860, Trans. Acad. Sci. St. Louis, i, p. 629, pl. xx, ff. 2a-c. *Pentremites robustus*, Lyon: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 156.

*Pentremites robustus*, S. S. Lyon: F. A. Bather, 1899, in Lankester's Zoology, Cap. Blastoidea, f. xv, l. Lower Carboniferous: Chester Group: Chester, Illinois, U.S.A. [E. 8145.] T. A. Worthen Coll. A well-preserved theca.

——. Lower Carboniferous, Chester Group: Chester, Illinois, U.S.A.

[E. 8153.] T. A. Worthen Coll. Four slightly weathered thecas.

[E. 8157.] T. A. Worthen Coll. One large theca.

——? Lower Carboniferous, Chester Group: Alleghanies, U.S.A.

[E. 759.] Presented by J. N. Pearson. A theca.

**Pentremites roemeri**, B. F. Shumard, 1855: v. **Orbitremites?** **roemeri** et **Schizoblastus missouriensis**.

**Pentremites sampsoni**, G. Hambach, 1884: v. **Schizoblastus sampsoni**.

**Pentremites sayi**, B. F. Shumard, 1855: v. **Schizoblastus sayi**.

**Pentremites schultzi**, E. J. A. d'Archiac & P. E. P. de Verneuil, 1845: v. **Cryptoschisma schulzi**.

**Pentremites sirius**, C. A. White, 1862: v. **Orophocrinus sirius**.

**Pentremites spinosus**, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 154, pl. B, f. 1. *Pentremites spinosus*, Hambach: R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 145.

**Pentremites stelliformis**, D. D. Owen & B. F. Shumard, 1850: v. **Orophocrinus stelliformis**.

**Pentremites?** **striatus**. *Pentremites striatus*, J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2), p. 485 (compared to *P. subtruncatus* [=Codaster] & *P. reinwardti* [=Troostocrinus]). “[*Pentremites*] *striatus*, Hall, MS.,” R. Etheridge fl. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 138.

**Pentremites subconoideus**, F. B. Meek, 1873, 6th Ann. Rep. U.S. Geol. Surv. Territ. for 1872, p. 471, footnote.



**Pentremites subcylindricus**, J. Hall & R. P. Whitfield, 1875 :  
v. **Metablastus ? subcylindricus**.

**Pentremites subtruncatus**, J. Hall, 1858 : v. **Codaster ? subtruncatus**.

**Pentremites sulcatus**. *Pentatrematites sulcatus*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 354, pl. vi, ff. 10 a-c. *Pentremites sulcatus*, Roemer : B. F. Shumard, 1886, Trans. Acad. Sci. St. Louis, ii, p. 385. Said by J. Hall & B. F. Shumard to include *Pentremites cherokeeus* (q. v.). *Pentremites sulcatus*, Roemer : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 165. Perhaps includes *Pentremites missouriensis*, Swallow (q. v.).

*Pentremites sulcatus*, C. F. Roemer : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 61, 101, 165, pl. i, ff. 9, 10. Lower Carboniferous, Chester Group : Chester, Illinois, U.S.A. [E. 8098.] A theca.

*Pentremites sulcatus*, C. F. Roemer : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 41, 94, 165, pl. xvi, f. 20, & pl. xviii, f. 5. Lower Carboniferous, Chester Group : Illinois, U.S.A. [E. 8099.] Micro-section, and the two halves of the theca from which it was cut.

——. Lower Carboniferous, Chester Group : Chester, Illinois, U.S.A.

[E. 757.] A large theca, and a rather weathered theca.

[E. 8155.] T. A. Worthen Coll. A very perfect theca.

[E. 8158.] T. A. Worthen Coll. Two well-preserved thecas, one rather crushed.

——. Lower Carboniferous, Chester Group : Franklin Co., Tennessee, U.S.A. [E. 8144.] T. A. Worthen Coll. A perfect theca, with peristomial covering-plates.

——. Lower Carboniferous, Chester Group : Evansville, Illinois, U.S.A. [E. 8156.] T. A. Worthen Coll. Three thecas.

**Pentremites sulcatus**, K. A. Zittel, 1879, Handb. d. Palaeont. i, p. 432, f. 305 a (non Roemer) : v. **Pentremites conoideus**.

**Pentremites symmetricus**, J. Hall, 1858 : v. **Pentremites piri-formis** and var. **symmetricus**.

**Pentremites tennesseæ**, G. Troost, nom. nud., 1849, Amer. Journ. Sci. (2) viii, p. 419 ; and 1850, Proc. Amer. Assoc. Adv. Sci. for 1849, p. 60. Quoted by B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 386 ; and by R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 145.

**Pentremites troosti**. *Pentremites globosus*, G. Troost MS., quoted by J. Hall, 1858, Rep. Geol. Surv. Iowa, i (2) p. 695, pl. xxv, f. 17 (non *P. globosa*, Say). *Pentremites troosti*, B. F. Shumard, 1866, Trans. Aca. Sci. St. Louis, ii, p. 386. "*Pentremites globosus* (Troost), Hall" : R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 144.

- . Lower Carboniferous, Chester Group: Evansville, Illinois, U.S.A. [E. 8161.] T. A. Worthen Coll. Three rather rolled thecas.
- . Lower Carboniferous, St. Louis Limestone: Hardin Co.<sup>1</sup>, Illinois, U.S.A.  
 [E. 8162.] T. A. Worthen Coll. Five nearly perfect thecas.  
 [E. 8163.] T. A. Worthen Coll. A theca with brachioles on matrix.  
 [E. 8164.] T. A. Worthen Coll. Five well-preserved thecas, labelled "*Pentremites koninckana*."
- Pentremites truncatus.** *Pentremites truncata*, T. A. Conrad, 1844, Proc. Acad. Nat. Sci. Philadelphia, 1843, (1) i, p. 334.
- Pentremites varsouviensis**, A. H. Worthen, 1875: v. **Metablastus varsouviensis**.
- Pentremites verneuili**, G. Troost, 1841: v. **Nucleocrinus verneuili**.
- Pentremites waterhousei**, J. Rofe, 1865: v. **Orophocrinus pentangularis**.
- Pentremites waterhousianus**, L. G. de Koninck & H. Le Hon, 1854: v. **Orophocrinus pentangularis**.
- Pentremites? whitei.** *Pentremites whitei*, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 150. "Genus indet.," R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 138. See also under **Pentremitidea filosa**.
- Pentremites woodmani**, F. B. Meek & A. H. Worthen, 1868: v. **Tricelocrinus woodmani**.
- Pentremites wortheni**, J. Hall, 1858: v. **Metablastus wortheni**.
- Pentremites sp.**, R. Etheridge fil. (pars), 1881: v. **Phænoschisma benniei**.
- Pentremites sp.**, G. F. Whidborne, 1881: v. **Tricelocrinus? leei**, et **Pentremitidea? whidbornei**.
- PENTREMITIDEA**, A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i, p. 102. *Pentremitidæ*, A. D. d'Orbigny, 1852, Cours élém. Pal. Géol. ii, p. 139. *Pentremitidea*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 220; and 1886, Cat. Blastoidea Brit. Mus. p. 169. Type-species—*P. paillettei*.

<sup>1</sup> This is the type-locality; but Hall quotes the species from "Kaskaskia Limestone" [=Chester Group].

**Pentremitidea acutangula.** *Pentremites acutangulus*, L. Schultze, 1867, Denkschr. Akad. Wiss. Wien, xxvi (2), p. 225, pl. xiii, ff. 6, 6 a-e. *Pentremitidea acutangula* (Schultze): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 223; and 1886, Cat. Blastoidea Brit. Mus. p. 171.

**Pentremitidea americana**, W. H. Barris, 1883, Rep. Geol. Surv. Illinois, vii, p. 363. *Pentremitidea americana*, Barris: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 171.

**Pentremitidea angulata**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 224; and 1886, Cat. Blastoidea Brit. Mus. p. 180.

*Pentremitidea angulata*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 224, **Ⓒ**; and 1886, Cat. Blastoidea Brit. Mus. pp. 17, 104, 180, pl. iv, ff. 13, 14, 16. Lower Devonian: [Catalogued as] “? Ferroñes, Province of Asturias, Spain”; [Registered as] “Sabero, Leon, Spain” [Original label missing]. [E. 792.] Transferred from Museum of Practical Geology. A theca.

— Lower Devonian: Sabero, Leon, Spain. [E. 791.] Presented by P. H. Carpenter. A theca which in all probability formed part of the type-material.

**Pentremitidea clavata.** *Pentremites clavatus*, L. Schultze, 1867, Denkschr. Akad. Wiss. Wien, xxvi (2), p. 225, pl. xiii, ff. 7, 7 a-e. *Pentremitidea clavata* (Schultze): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 223; and 1886, Cat. Blastoidea Brit. Mus. p. 176.

*Pentremitidea clavata* (L. Schultze): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 104, 176, pl. iv, ff. 17, 18. Middle Devonian, Eifel Limestone: The Eifel<sup>1</sup>, Germany. [E. 794.] A theca.

— Lower Devonian: Sabero, Leon, Spain. [E. 793.] Presented by P. H. Carpenter. Two thecas.

**Pentremitidea clavata**, var. **schultzei**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 177, pl. v, ff. 3-5.

*Pentremitidea clavata*, var. *schultzei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 56, 93, 104, 177, pl. v, ff. 3, 4, 5. **Ⓒ**. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 8124.] Presented by P. H. Carpenter. A theca, type of var.

**Pentremitidea cottaldi** (Munier-Chalmas): R. Etheridge fil. & P. H. Carpenter, 1883: v. **Metablastus cottaldi**.

**Pentremitidea eifelensis.** *Pentatrematites pailleti*, C. F. Roemer, 1851, Arch. Naturges. xvii (1), p. 368 (pars). *Pentatrematites eifeliensis*, C. F. Roemer, 1855, Lethæa Geogn. Ed. iii, Theil 2, p. 280, footnote.

<sup>1</sup> The definite locality “Nollenbach, near Kerpen,” as given in Cat. Blastoidea, is copied from Schultze; the source of this specimen is unknown.

*Pentremites eifeliensis* (Roemer), L. Schultze, 1867, Denkschr. Akad. Wiss. Wien, xxvi (2), p. 223, pl. xiii, ff. 5, *b, c* (? 5, 5, *a, d, e*). *Pentremitidea eifelensis* (Roemer): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 223; and 1886, Cat. Blastoidea Brit. Mus. p. 174.

*Pentremitidea eifelensis* (C. F. Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 11, 104, 174, pl. v, ff. 1, 2. Middle Devonian, Eifel-kalk: Gerolstein, Eifel, Germany. [E. 8123.] A theca.

——. Middle Devonian, Eifel-kalk: Gerolstein, Eifel, Germany.

[E. 397.] Two thecas.

[E. 673.] Two thecas.

[E. 1204.] Presented by J. E. Lee. Thirty-two thecas.

——. Middle Devonian, Eifel-kalk: Prüm, Eifel, Germany. [E. 1727.] Presented by Frank Springer. Six thecas.

***Pentremitidea filosa***, J. F. Whiteaves, 1887, Contrib. Canad. Palæont. i, p. 104, pl. xiv, ff. 1, 1 *a, b*; "perhaps the same as *Pentremites whitei*, Hall."

***Pentremitidea filosa?*** *Pentremitidea filosa*, Whiteaves?: S. Weller, May 1898, Ann. N.Y. Acad. Sci. xi, pp. 122, 123, pl. xiv, f. 3.

***Pentremitidea fraiponti***. *Pentremites fraiponti*, J. Fraipont, ex G. Dewalque, MS., 1884, Ann. Soc. géol. Belgique, xi, p. 114, pl. i, ff. 6, *a-g*. *Pentremitidea fraiponti*, "Dewalque": R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 171.

***Pentremitidea gilbertsoni***, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 179, pl. v, ff. 9, 10, 11.

*Pentremitidea gilbertsoni*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 179.  $\mathcal{T}$ . Lower Devonian: Colle, near Sabero, Leon, Spain. [E. 662.] Presented by P. H. Carpenter. A theca forming part of type-material but not the figured specimen.

***Pentremitidea? gracilis***. *Pentrematites gracilis*, J. v. Steininger, 1849, Jahresh. Schul-Cursus, 1848-49, Gymnas. zu Trier, p. 19. *Pentremitidea? gracilis* (Steininger): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 171, 181.

***Pentremitidea? leda***. *Pentremites leda*, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N.Y. p. 149, pl. i, f. 11. *Pentremitidea? leda* (Hall): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 171. *Granatocrinus leda* (Hall): J. F. Whiteaves (& C. Wachsmuth), 1887, Contrib. Canad. Palæont. i, p. 108, pl. xiv, ff. 3, 3 *a-f*.

***Pentremitidea? leda*, var. *maia***. *Pentremites maia*, J. Hall, 1862, 15th Rep. State Cab. Nat. Hist. N. Y. p. 150, pl. i, f. 10. "Genus indet.," R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 138. Var. of *Pentremitidea* (vel *Granatocrinus*) *leda*, R. P. Whitfield, quoted in J. F. Whiteaves, 1887, Contrib. Canad. Palæont. i, p. 109.



**Pentremitidea lusitanica**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 223; and 1886, Cat. Blastoidea Brit. Mus. p. 173, pl. iv, ff. 11, 12, 15, pl. v, f. 20, pl. x, f. 1.

*Pentremitidea lusitanica*. R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 223, **T**; and 1886, Cat. Blastoidea Brit. Mus. pp. 24, 62, 104, 173, pl. iv, ff. 11, 12, 15. Lower Devonian, Calcaire de Ferroñes; Asturias, Spain. [E. 789.] Transferred from Museum of Practical Geology. A theca.

— Lower Devonian: Asturias, Spain. [E. 790.] Presented by P. H. Carpenter. Two thecas, forming part of type-material.

**Pentremitidea malladai**. *Pentremitidea malladæ*, R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 243. *Pentremitidea malladai*, Eth. & Carp.: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 175.

*Pentremitidea malladæ*, R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 243, **T**. *Pentremitidea malladai*, Eth. & Carp.: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 104, 175, pl. v, ff. 18, 19. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 786.] A theca.

**Pentremitidea medusa**, O. Jaekel, 1895, Palæont. Abhandl. vii, p. 12, pl. i & pl. ii, f. 2.

**Pentremitidea milwaukensis**, S. Weller, May 17, 1898, Ann. N. Y. Acad. Sci. xi, pp. 123, 124, pl. xiv, f. 5.

**Pentremitidea paillettei**. *Pentremites pailletti*, P. E. P. de Verneuil, 1844, Bull. Soc. géol. France (2) i, p. 213, pl. iii, ff. 4, 5. *Pentremites pailletti*, E. J. A. d'Archiac & P. E. P. de Verneuil, 1845, Bull. Soc. Géol. France (2) ii, p. 479, pl. xv, ff. 10, 11. *Pentremitidea paillettei* (de Verneuil): A. D. d'Orbigny, 1849, Prodr. Pal. Strat. i, p. 102. *Pentrematites pailletti*, de Verneuil: C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 368, pl. vii, ff. 17 a-c. *Pentremites dutertrii* (errore), C. F. Roemer, *op. cit.* p. 374. *Pentremitidea pailletti* (de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 223. *Pentremitidea paillettei* (de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 172.

*Pentremitidea paillettei* (P. E. P. de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 49, 172, pl. xvii, f. 11. Lower Devonian, Calcaire de Ferroñes: Asturias<sup>1</sup>, Spain. [E. 1062.] Longitudinal micro-section of theca.

*Pentremitidea paillettei* (P. E. P. de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 104, 172, pl. iv,

<sup>1</sup> This locality was said by Etheridge & Carpenter, 1886, to be unrepresented in the Museum collection; but this specimen and 38609 were registered and labelled "Asturias," and so given in Explanation to Plates.



f. 8. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain [as on p. 173, not "Asturias" as in Explanation of Plate]. [E. 8126.] Transferred from Museum of Practical Geology. A theca.

*Pentremitidea paillettei* (P. E. P. de Verneuil): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 24, 172, pl. xiv, f. 13. Lower Devonian (? Calcaire de Ferroñes): Asturias, Spain [as in Explanation to Plate, not "Colle, near Sabero, Leon" as on p. 173]. [38609 a]. Presented by S. P. Pratt. A theca.

——. Lower Devonian (? Calcaire de Ferroñes): Asturias, Spain. [38609.] Presented by S. P. Pratt. Two thecas.

——. Lower Devonian: Sabero, Leon, Spain. [E. 785.] Transferred from Museum of Practical Geology. Eleven thecas, some cut in half.

**Pentremitidea paillettei**, P. H. Carpenter (pars), 1882 (non de Verneuil): v. **Phænoschisma archiaci**.

**Pentremitidea ? phillipsi**. *Pentremites* or *Penttetrematites ovalis*, J. Phillips, 1841, Pal. Foss. Cornwall, p. 29, pl. xiv, ff. 40 a, b (non Goldfuss). Gen. et sp. indet., R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 129, 139. *Pentremitidea phillipsii*, G. F. Whidborne, 1899, Pal. Soc. for 1898, Mon. Devon. Fauna, iii (3), p. 212, pl. xxix, ff. 5, 5 a, 6.

**Pentremitidea plana**. *Penttetrematites planus*, G. Sandberger, 1842, nom. nud., Neues Jahrb. f. Min. 1842, p. 396; and G. & C. L. F. Sandberger, 1856, Verstein. Rhein. Schichten Nassau, p. 403, pl. xxv, ff. 4 a, b. "An aberrant *Pentremitidea*," R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 181.

**Pentremitidea roemeri**. *Pentremites eifeliensis*, L. Schultze, 1867, Denkschr. Akad. Wiss. Wien, xxvi (2) p. 223, pl. xiii, ff. 5, 5 a, d, e (non 5 b, c). *Pentremitidea roemeri*: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 175, pl. v, f. 15, & pl. xvi, f. 11.

**Pentremitidea schultii** (E. J. A. d'Archiac & P. E. P. de Verneuil): A. D. d'Orbigny, 1849: v. **Cryptoschisma schulzi**.

**Pentremitidea similis**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 225; and 1886, Cat. Blastoidea Brit. Mus. p. 180, pl. v, f. 16, & pl. x, ff. 2-4.

*Pentremitidea similis*: R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 225,  $\text{C}$ ; and 1886, Cat. Blastoidea Brit. Mus. pp. 104, 180, pl. v, f. 16. Middle Devonian, Eifel-kalk: Prüm, Eifel, Germany. [E. 788.] The Authors' label states that this is also the original of Cat. Blastoidea, pl. x, ff. 2, 3, 4, which is impossible.

——? Middle Devonian: Gerolstein, Eifel, Germany. [E. 2012.] Presented by J. E. Lee. A theca.

**Pentremitidea wachsmuthi**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 178, pl. v, ff. 6-8.

*Pentremitidea wachsmuthi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 20, 24, 37, 178, pl. v, ff. 6, 7, 8. **⊕**. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 787.] Presented by P. H. Carpenter. A theca.

— Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 8125.] Presented by P. H. Carpenter. Two thecas, one broken at the basi-radial sutures. They form part of type-material.

**Pentremitidea whidbornei**. *Pentremites* sp., G. F. Whidborne, 1881, Geol. Mag. (2) viii, p. 288. *Pentremitidea ? whidbornei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 130, 171, pl. iv, f. 7. The type is in the Rev. G. F. Whidborne's collection.

**PHÆNOSCHISMA**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 226; and 1886, Cat. Blastoidea Brit. Mus. p. 270. Type-species—*P. acutum*.

**Phænoschisma acutum**. *Pentatrematites acuta*, G. B. Sowerby, 1834, Zool. Journ. v, p. 456, Suppl.-pl. xxxiii, f. 6 (2 views). *Pentremites acutus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, ff. 4, 5, 5\*. *Phænoschisma acutum* (Sowerby): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 229; and 1886, Cat. Blastoidea Brit. Mus. p. 276, pl. xiv, ff. 10-12.

*Pentatrematites acuta* (G. B. Sowerby), 1834, Zool. Journ. v, p. 456, Suppl.-pl. xxxiii, f. 6<sup>1</sup>. **⊕**. *Pentremites acutus*, "Gilb.": J. Phillips, 1836, Geol. Yorksh. ii, p. 207, pl. iii, ff. 4, 5, 5\*. *Phænoschisma acutum* (G. B. Sowerby): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 276, pl. xiv, ff. 10, 11, 12. Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire (probably from the Calamine Mines). [E. 8130.] Gilbertson Coll., No. 75. A theca.

— Lower Carboniferous, Carboniferous Limestone: Bolland, Lancashire, England. [E. 831.] Gilbertson Coll., No. 75.

**Phænoschisma archiaci**. *Pentremitidea pailleti* (pars), P. H. Carpenter, 1882, Rep. Brit. Assoc. for 1881, pt. 2, p. 634 (non de Verneuil). *Phænoschisma archiaci*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 230; and 1886, Cat. Blastoidea Brit. Mus. p. 274, pl. xi, f. 7, pl. xii, f. 10, pl. xiv, ff. 5-7, pl. xvii, f. 15.

*Phænoschisma archiaci*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 230, **⊕**; and 1886, Cat. Blastoidea Brit. Mus.

<sup>1</sup> Not ff. 6 a-c, as quoted by Etheridge & Carpenter, *loc. cit.* There are not 3 figures, only 2, and these are not lettered. It was probably intended to letter the ambulacral areas in the upper figure, but this was not done. The plate is rare, and apparently was not seen by Etheridge & Carpenter.

pp. 62, 274, pl. xiv, f. 6. Lower Devonian, Calcaire de Ferroñes : Ferroñes, Asturias, Spain. [E. 8032.] J. Tennant Coll. A theca, one of two type-specimens.

*Phænoschisma archiaci*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. [Hist. (5) ix, p. 230,  $\text{¶}$ ; and 1886, Cat. Blastoidea Brit. Mus. pp. 20, 89, 274, pl. xii, f. 10, & pl. xiv, ff. 5, 7. Lower Devonian, Calcaire de Ferroñes : Ferroñes, Asturias, Spain. [E. 8033.] J. Tennant coll. A theca, one of two type-specimens.

*Phænoschisma archiaci*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 89, 274, pl. xvii, f. 15. Lower Devonian, Calcaire de Ferroñes : Asturias, Spain. [E. 1061.] Longitudinal micro-section of theca.

*Phænoschisma archiaci*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 275, pl. xi, f. 7. Lower Devonian, Calcaire d'Arnao : Colle, near Sabero, Leon, Spain. [E. 8031.] Transferred from Museum of Practical Geology. Theca ground on top.

— Lower Devonian, Calcaire d'Arnao : Colle, near Sabero, Leon, Spain. [E. 829.] Transferred from Museum of Practical Geology. Seven thecas.

— Lower Devonian, Calcaire de Ferroñes : Ferroñes, Asturias, Spain. [E. 830.] J. Tennant Coll. Ten thecas, which probably formed part of type-material.

**Phænoschisma benniei.** *Pentremites* sp., R. Etheridge fil. (pars), 1881, Proc. Nat. Hist. Soc. Glasgow, iv, p. 260; pl. v, f. 7. *Phænoschisma benniei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 278, pl. ii, f. 37, pl. iv, ff. 5, 6.

*Phænoschisma benniei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 278.  $\text{¶}$  Lower Carboniferous, Carboniferous Limestone (Shale above No. 2 Limestone) : Kidlaw Quarries, near Gifford, Haddingtonshire, Scotland. [E. 666.] Presented by P. H. Carpenter. Two thecas, forming part of type-material, but not figured.

— Lower Carboniferous, Carboniferous Limestone (Shale above No. 2 Limestone) ; Kidlaw Quarries, Haddingtonshire, Scotland. [E. 1114.] Presented by J. Bennie. One theca.

— Lower Carboniferous, Carboniferous Limestone (Shale over No. 2 Limestone) : East Salton, Haddingtonshire, Scotland. [E. 1115.] Presented by J. Bennie. Six thecas.

**Phænoschisma caryophyllatum.** *Pentremites inflatus*?, L. G. de Koninck, 1842, Descr. Anim. Foss. Carbonif. Belgique, p. 38 (non Sowerby). *Pentatrematites orbignyianus*?, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 358, pl. iv, ff. 16 a-c only (non de Koninck). *Pentremites caryophyllatus*, L. G. de Koninck & H. Le Hon, 1854, Mém. Acad. Roy. Belgique, xxviii (2), p. 197, pl. vii, ff. 3 a-c. *Phænoschisma caryophyllatum* (de Koninck & Le Hon) : R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 229; and 1886, Cat. Blastoidea Brit. Mus. p. 277, pl. xiv, ff. 1-4, & pl. xvii, f. 16.

[**Phænoschisma caryophyllatum**, continued.]

*Phænoschisma caryophyllatum* (de Koninck & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 89, 227, pl. xvii, f. 16. Lower Carboniferous, Assise des Écaussines: Tournay, Belgium. [E. 1053.] L. G. de Koninck Coll. A horizontal micro-section of theca.

*Phænoschisma caryophyllatum* (de Koninck & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 277, pl. xiv, f. 1. Lower Carboniferous, Assise des Écaussines: Tournay, Belgium. [E. 8034.] L. G. de Koninck Coll. A theca.

*Phænoschisma caryophyllatum* (de Koninck & Le Hon): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 16, 57, 89, 277, pl. xiv, ff. 3, 4 (& ? f. 2). Lower Carboniferous, Assise des Écaussines: Tournay, Belgium. [E. 8035.] L. G. de Koninck Coll. A theca.

— Lower Carboniferous, Assise des Écaussines: Tournay, Belgium. [E. 833.] L. G. de Koninck Coll. Sixteen thecas.

[E. 8036.] L. G. de Koninck Coll. A horizontal micro-section of the theca.

**Phænoschisma ? kentuckyense.** *Pentremites* (*Codaster* ?) *kentuckyensis*, B. F. Shumard, 1858, Trans. Acad. Sci. St. Louis, i, p. 239, pl. ix, f. 5. *Codaster kentuckyensis* (Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 359. *Phænoschisma ? kentuckyensis* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 142, 273.

**Phænoschisma nobile**, R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 246; and 1886, Cat. Blastoidea Brit. Mus. p. 275, pl. xi, ff. 1-4.

*Phænoschisma nobile*, R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 246, **Ⓞ**; and 1886, Cat. Blastoidea Brit. Mus. pp. 30, 60, 89, 275, pl. xi, ff. 1, 4. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 663 a.] Presented by P. H. Carpenter. A theca, one of two type-specimens.

*Phænoschisma nobile*, R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 246, **Ⓞ**; and 1886, Cat. Blastoidea Brit. Mus. pp. 30, 89, 275, pl. xi, ff. 2, 3. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 663 b.] Presented by P. H. Carpenter. A theca, one of two type-specimens.

**Phænoschisma verneuili**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 229; and 1886, Cat. Blastoidea Brit. Mus. p. 273, pl. x, f. 18, pl. xi, ff. 5, 6, pl. xiv, ff. 8, 9.

*Phænoschisma verneuili*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 229, **Ⓞ**; and 1886, Cat. Blastoidea Brit. Mus. pp. 62, 89, 273, pl. xi, f. 5, & pl. xiv, f. 9. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 832.] Transferred from Museum of Practical Geology. A theca, one of two type-specimens.



*Phenoschisma verneuli*, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 229, **Ⓒ**; and 1886, Cat. Blastoidea Brit. Mus. pp. 24, 273, pl. x, f. 10, pl. xiv, f. 8. Lower Devonian, Calcaire d'Arnao: Colle, near Sabero, Leon, Spain. [E. 8030.] Transferred from Museum of Practical Geology. A theca, one of two type-specimens.

**PHYLLOCRINUS**, A. D. d'Orbigny, 1850, Prodr. Pal. Strat. ii, p. 110. Type-species—*P. malbosianus*. "C'est un *Pentremites*," etc., A. D. d'O. Long considered a Blastoid, but now referred to the Crinoid family, Eugeniocrinidæ.

**Platycrinites pentangularis**, J. S. Miller, 1821: v. **Orophocrinus pentangularis**.

**Protocrinites foveolatus**, Eichwald, 1859: v. **Asteroblastus stellatus**.

**SCHIZOBLASTUS**, R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 243; and 1886, Cat. Blastoidea Brit. Mus. p. 220. Type-species—*S. sayi*.

**Schizoblastus bailyi**. *Schizoblastus bailyi*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 223, 228, pl. xvi, ff. 12, 13.

**Schizoblastus glaber** (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Mesoblastus? glaber**.

**Schizoblastus? granulosus**. *Pentremites (Granatocrinus?) granulosus*, F. B. Meek & A. H. Worthen, 1865, Proc. Acad. Nat. Sci. Philadelphia, 1865, p. 165. *Granatocrinus granulosus*, Meek & Worthen: F. B. Meek & A. H. Worthen, 1873, Rep. Geol. Surv. Illinois, v, p. 508, pl. xv, f. 10. *Schizoblastus? granulosus* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 247; and 1886, Cat. Blastoidea Brit. Mus. p. 223.

— Lower Carboniferous, Keokuk Group: Warsaw, Illinois, U.S.A. [E. 8180.] T. A. Worthen Coll. Two thecas, one of which is crushed.

**Schizoblastus? lotoblastus** (C. A. White): R. Etheridge fil. & P. H. Carpenter, 1886: v. **Orbitremites? lotoblastus**.

**Schizoblastus? magnibasis**, R. R. Rowley, 1895: v. **Orbitremites? magnibasis**.

**Schizoblastus melo** (D. D. Owen & B. F. Shumard): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Cryptoblastus melo**.

**Schizoblastus melonoides**. *Granatocrinus melonoides*, F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 88; and 1873, Rep. Geol. Surv. Illinois, v, p. 468, pl. ix, f. 1.



[**Schizoblastus melonoides**, continued.]

*Schizoblastus melonoides* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 246; and 1886, Cat. Blastoidea Brit. Mus. p. 226, pl. vi, ff. 15, 16.

— Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A. [E. 814.] C. Wachsmuth Coll. A theca.

**Schizoblastus ? missouriensis.** *Pentremites roemeri*, B. F. Shumard, 1855, in Swallow's First & Second Rep. Geol. Surv. Missouri, pt. 2, p. 186, pl. B, ff. 2, *b, c, d* (non *a* = *Orbitremites roemeri*). *Granatocrinus missouriensis*, B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 375. *Schizoblastus ? missouriensis* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 247; and 1886, Cat. Blastoidea Brit. Mus. p. 244. *Schizoblastus ? roemeri* (Shumard): C. R. Keyes, 1894, Rep. Geol. Surv. Missouri, iv, p. 137; who includes in it *Pentremites sampsoni*, Hambach (v. **Schizoblastus sampsoni**).

**Schizoblastus ? neglectus.** *Granatocrinus neglectus*, F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia, 1869, p. 90; and 1873, Rep. Geol. Surv. Illinois, v, p. 471, pl. ix, f. 3. *Schizoblastus ? neglectus* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 246; and 1886, Cat. Blastoidea Brit. Mus. p. 223.

**Schizoblastus pisum** (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Cryptoblastus pisum**.

**Schizoblastus potteri** (G. Hambach): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Schizoblastus sayi**.

**Schizoblastus ? projectus** (F. B. Meek & A. H. Worthen): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Cryptoblastus ? projectus**.

**Schizoblastus ? roemeri**: v. **Orbitremites ? roemeri** et **Schizoblastus ? missouriensis**.

**Schizoblastus rofei.** *Granatocrinus rofei*, nom. nud., R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 238. *Schizoblastus rofei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 228, pl. vi, f. 17, pl. viii, ff. 9-11, pl. xvii, f. 2. *Schizoblastus rofei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 92, 228, pl. xvii, f. 2. **Ⓒ**. Lower Carboniferous, Carboniferous Limestone: Foot of Beneachlin, Florence Court, Fermanagh [not Wexford, as in explanation to plate], Ireland. [E. 1059.] Presented by Lord Enniskillen. Micro-section and the theca from which it was cut. One of three type-specimens.

*Schizoblastus rofei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 15, 228, pl. vi, f. 17. **Ⓒ**. Lower Carboniferous, Carboniferous Limestone: Foot of Beneachlin, Florence

Court, Fermanagh, Ireland. [E. 8042.] Presented by Lord Enniskillen. An imperfect, much weathered theca. One of three type-specimens.

*Schizoblastus rofei*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 29, 62, 110, 228, pl. viii, ff. 9, 10, 11.  $\mathcal{T}$ . Lower Carboniferous, Carboniferous Limestone: Foot of Beneachlin, Florence Court, Fermanagh, Ireland. [E. 8043.] Presented by Lord Enniskillen. A small theca, with a little adherent matrix; one of three type-specimens.

— Lower Carboniferous, Carboniferous Limestone: Foot of Beneachlin, Florence Court, Fermanagh, Ireland. [E. 817.] Presented by Lord Enniskillen. Fifteen thecas, forming part of type-material, but not figured.

**Schizoblastus? sampsoni.** *Pentremites sampsoni*, G. Hambach, 1884, Trans. Acad. Sci. St. Louis, iv, pp. 551, 552, pl. D, ff. 2, 2a. *Schizoblastus? sampsoni* (Hambach): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 223. Syn. of *Schizoblastus? roemeri* (Shumard): C. R. Keyes, 1894, Rep. Geol. Surv. Missouri, iv, p. 137; and S. A. Miller, 1897, Second Appendix to N. Amer. Geol. & Palæont. p. 749 (v. **S. missouriensis**).

**Schizoblastus sayi.** *Pentremites sayi*, B. F. Shumard, 1855, in Swallow's First & Second Rep. Geol. Surv. Missouri, pt. 2, p. 185, pl. B, ff. 1, a-d. *Granatocrinus sayi* (Shumard): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 376. *Pentremites potteri*, G. Hambach, 1880, Trans. Acad. Sci. St. Louis, iv, p. 156, pl. B, f. 4. *Schizoblastus sayi* (Shumard): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 246; and 1886, Cat. Blastoidea Brit. Mus. p. 223, footnote, p. 224, pl. iii, ff. 1-3, pl. vi, f. 18, pl. x, f. 17, pl. xvii, f. 1; also as *Schizoblastus potteri* (Hambach), *op. cit.* p. 142.

— Lower Carboniferous, Upper Burlington Limestone: Burlington, Iowa, U.S.A.

[E. 815.] C. Wachsmuth Coll. Five thecas, two ground on top.

[E. 816.] L. Saemann Coll. Five specimens, 3 whole and 2 half thecas.

[E. 8179.] T. A. Worthen Coll. Two thecas, one in chert, a weathered internal cast.

— Lower Carboniferous, Upper Burlington Limestone (Chert): Louisiana, Mo., U.S.A. [E. 8005.] R. R. Rowley coll. Three thecas.

**Schizoblastus? shumardi.** *Granatocrinus shumardi*, F. B. Meek & A. H. Worthen, 1866, Proc. Acad. Nat. Sci. Philadelphia, 1866, p. 257; and 1868, Rep. Geol. Surv. Illinois, iii, p. 498, pl. xviii, f. 6 b. *Schizoblastus? shumardi* (Meek & Worthen): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 223; also as *Mesoblastus? shumardi* on pp. 244, 245.

**Schizoblastus sp.** Lower Carboniferous, Keokuk Group: Warsaw, Illinois, U.S.A. [E. 8188.] T. A. Worthen Coll. A small theca, probably young.

**STEGANOBLASTUS.** *Astrocystites*, J. F. Whiteaves, July 1897, *Canad. Rec. Sci.* vii, p. 287 (non *Astrocystis*, Haeckel). *Steganoblastus*, J. F. Whiteaves, Jan. 1898, *Canad. Rec. Sci.* vii, p. 395. Type-species—*S. ottawaensis*.

**Steganoblastus canadensis**, J. F. Whiteaves, 1898: v. **Steganoblastus ottawaensis**.

**Steganoblastus ottawaensis.** *Astrocystites ottawaensis*, J. F. Whiteaves, July 1897, *Canad. Rec. Sci.* vii, p. 287, ff. 1-3. *Steganoblastus canadensis*, J. F. Whiteaves, Jan. 1898, *Canad. Rec. Sci.* vii, p. 395.

**STEPHANOCRINUS**, T. A. Conrad, 1842, *Journ. Acad. Nat. Sci. Philadelphia*, viii, p. 278. Type-species—*S. angulatus*. This genus is now referred to the Crinoidea, and the names of undoubted Crinoid species are not quoted in the present list.

**Stephanocrinus pentalobus** (Hall): S. A. Miller, 1889: v. **Metablastus? pentalobus**.

**Stephanocrinus pulchellus** (S. A. Miller & C. B. Dyer): S. A. Miller, 1889: v. **Codaster pulchellus**.

**TRICÆLOCRINUS**, F. B. Meek & A. H. Worthen, 1868, *Proc. Acad. Nat. Sci. Philadelphia* for 1868, p. 358; and 1873, *Geol. Surv. Illinois*, v, p. 507 (as subgenus of *Pentremites*). *Tricælocrinus*, Meek & Worthen: R. Etheridge fil. & P. H. Carpenter, 1883, *Ann. Mag. Nat. Hist.* (5) xi, p. 242; and 1886, *Cat. Blastoidea Brit. Mus.* p. 203. Type-species—*T. woodmani*.

**Tricælocrinus? carpenteri**, R. Etheridge fil., 1892, in R. Etheridge & R. L. Jack, *Geol. & Palæont. Queensland*, p. 212, pl. xlv, f. 3.

**Tricælocrinus? laterniformis.** *Pentremites laterniformis*, D. D. Owen & B. F. Shumard, 1850, *Journ. Acad. Nat. Sci. Philadelphia* (2) ii, p. 66, pl. vii, f. 15. "*Troosticrinus laterniformis* [Owen & Shumard] (= *Pentatremites obliquatus*, Roemer): B. F. Shumard, 1866, *Trans. Acad. Sci. St. Louis*, ii, p. 384. "*Pentremites laterniformis* [Owen & Shumard] (= *P. sulcatus*, Roemer)": G. Hambach, 1880, *Trans. Acad. Sci. St. Louis*, iv, p. 147. "Internal cast of *Pentremites?* sp. indet.," R. Etheridge fil. & P. H. Carpenter, 1886, *Cat. Blastoidea Brit. Mus.* pp. 156, 192. *Troostocrinus laterniformis* (Owen & Shumard): S. A. Miller, 1892, First Appendix to *N. Amer. Geol. & Palæont.* p. 682.

**Tricælocrinus? leei**, G. F. Whidborne, 1889, *Geol. Mag.* (3) vi, p. 80.

*Pentremites* sp., G. F. Whidborne, 1881, *Geol. Mag.* (2) viii, p. 288; "fragmentary specimen . . . in the collection of Mr. J. E. Lee;" *Metablastus* sp., "has much the aspect of a *Tricælocrinus* or

*Troostocrinus*

*Metablastus*," R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 130, 139, 198. *Tricelocrinus? leei*, G. F. Whidborne, 1889, Geol. Mag. (3) vi, p. 80.  $\mathcal{T}$ . Middle Devonian (Tor Bay Limestone): Barton, S. Devon, England. [E. 1044.] Presented by J. E. Lee. Imperfect theca, unique specimen.

**Tricelocrinus meekianus**, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 208, pl. xvi, ff. 17, 18.

*Tricelocrinus meekianus*, R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 197, 204, 208, pl. xvi, ff. 17, 18.  $\mathcal{T}$ . Lower Carboniferous, St. Louis Group (Warsaw Limestone): Spergen Hill, Indiana, U.S.A. [E. 824.] A theca.

**Tricelocrinus obliquatus**. *Pentatrematites obliquatus*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 367, pl. vi, f. 11, *a*, *b* (includes *Pentremites occidentalis*, B. F. Shumard MS., fide Roemer). *Pentremites obliquatus*, Roemer: F. Dujardin & H. Hupé, 1862, Hist. Nat. Echinod. p. 97. *Tricelocrinus obliquatus* (Roemer): R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 243; and 1886, Cat. Blastoidea Brit. Mus. p. 206, pl. xviii, ff. 10-13.

*Tricelocrinus obliquatus* (Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 95, 206, pl. xviii, ff. 10, 11. Lower Carboniferous, St. Louis Group (Warsaw Limestone): Washington Co., Indiana, U.S.A. [E. 823.] A radial.

*Tricelocrinus obliquatus* (Roemer): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 95, 206, pl. xviii, ff. 12, 13. Lower Carboniferous, St. Louis Group (Warsaw Limestone): Washington Co., Indiana, U.S.A. [E. 8093.] Lower part of right anterior radial.

**Tricelocrinus obliquatus**, F. B. Meek & A. H. Worthen, 1875, Rep. Geol. Surv. Illinois, vi, p. 521, pl. xxxi, ff. 4 *a*, *b* (non Roemer): v. **Tricelocrinus sp.**

**Tricelocrinus varsouviensis**, A. H. Worthen, 1875: v. **Metablastus varsouviensis**.

**Tricelocrinus woodmani**. *Pentremites (Troostocrinus? vel Tricelocrinus?) woodmani*, F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia for 1868, p. 356; and 1873, Geol. Surv. Illinois, v, p. 506, pl. xvi, f. 4. *Tricelocrinus woodmani*, M. & W.: R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 242; and 1886, Cat. Blastoidea Brit. Mus. p. 206, pl. xix, ff. 13-16.

*Tricelocrinus woodmani* (Meek & Worthen): F. A. Bather, 1899, in Lankester's Zoology, Cap. Blastoidea, f. xv, 2. Lower Carboniferous: Canton, Indiana, U.S.A. [E. 8171.] T. A. Worthen Coll. A good theca.



**Tricelocrinus** sp. Lower Carboniferous (probably St. Louis Group): Canton, Indiana, U.S.A. [E. 8187.] T. A. Worthen Coll. A rather weathered theca in chert. Probably the same as *Tricelocrinus obliquatus*, Meek & Worthen, non Roemer.

**TROOSTOCRINUS.** *Troosticrinus*, B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii. p. 384, footnote. *Troostocrinus*, Shumard: F. B. Meek & A. H. Worthen, 1869, Proc. Acad. Nat. Sci. Philadelphia for 1868, p. 356; and 1873, Rep. Geol. Surv. Illinois, v. p. 507 (as subgenus of *Pentremites*). *Troostocrinus*, Shumard: R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 247; and 1886, Cat. Blastoidea Brit. Mus. p. 191. Type-species—*T. reinwardti*.

**Troostocrinus bipyramidalis** (J. Hall): Shumard, 1866: v. **Metablastus bipyramidalis.**

**Troostocrinus?** **clavatus** (G. Hambach): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Pentremites clavatus.**

**Troostocrinus cottaldi** (Munier-Chalmas): R. Etheridge fil. & P. H. Carpenter, 1883: v. **Metablastus cottaldi.**

**Troostocrinus?** **grosvenori.** *Pentremites grosvenori*, B. F. Shumard, 1858, Trans. Acad. Sci. St. Louis, i, p. 240, pl. ix, ff. 2a-d. *Troosticrinus?* *grosvenori*, B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 384, footnote. *Troostocrinus?* *grosvenori*, Shumard: R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 249; and 1886, Cat. Blastoidea Brit. Mus. p. 194.

**Troostocrinus hispanicus**, R. Etheridge fil. & P. H. Carpenter, 1883: v. **Metablastus hispanicus.**

**Troostocrinus laterniformis** (Owen & Shumard): B. F. Shumard, 1866: v. **Tricelocrinus laterniformis.**

**Troostocrinus lineatus** (Shumard): B. F. Shumard, 1866: v. **Metablastus lineatus.**

**Troostocrinus nitidulus**, S. A. Miller & W. F. E. Gurley, 1890, Descr. new gen. and sp. Echinodermata, p. 58, Danville, Ill.; and 1891, Rep. Geol. Surv. Indiana, xvi, for 1888, p. 373; and pl. ix, ff. 14, 15, pl. x, f. 14, of both publications.

**Troostocrinus reinwardti.** *Pentremites reinwardtii*, G. Troost, 1835, Trans. Geol. Soc. Pennsylvania, i, p. 224, pl. x, ff. 10, 11. *Pentatremites reinwardtii*. Troost: C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 372, pl. vi, ff. 12 a-c. *Troosticrinus reinwardtii* (Troost): B. F. Shumard, 1866, Trans. Acad. Sci. St. Louis, ii, p. 384, footnote. *Troostocrinus reinwardtii* (Troost): R. Etheridge fil. & P. H. Carpenter, 1882, Ann. Mag. Nat. Hist. (5) ix, p. 249. *Troostocrinus reinwardti*



(Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 194, Text-fig. vii, pl. xii, ff. 11, 12, pl. xvii, f. 17.

*Troostocrinus reinwardti* (G. Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 36, 194, pl. xii, f. 11. Silurian, Niagara Group: Decatur Co., W. Tennessee, U.S.A. [E. 8094.] A theca.

*Troostocrinus reinwardti* (G. Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 93, 194, pl. xii, f. 12: Silurian, Niagara Group: Decatur Co., W. Tennessee, U.S.A. [E. 8095.] A theca.

*Troostocrinus reinwardti* (G. Troost): R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 94, 194, pl. xvii, f. 17: Silurian, Niagara Group: Decatur Co., W. Tennessee, U.S.A. [E. 8096.] A micro-section and the theca from which it was cut.

——. Silurian, Niagara Group: Decatur Co., W. Tennessee, U.S.A. [E. 825.] A theca.

**Troostocrinus subcylindricus** (Hall & Worthen): S. A. Miller, 1889: v. **Metablastus? subcylindricus**.

**Troostocrinus subtruncatus** (J. Hall): R. Etheridge fil. & P. H. Carpenter, 1882: v. **Codaster? subtruncatus**.

**Troostocrinus wachsmuthi**, W. F. E. Gurley, 1884: v. **Metablastus wachsmuthi**.

**Troostocrinus? woodmani**, F. B. Meek & A. H. Worthen, 1868: v. **Tricelocrinus woodmani**.

**Troostocrinus wortheni** (J. Hall): B. F. Shumard, 1866: v. **Metablastus wortheni**.

**ZYGOCRINUS.** *Astracrinites*, T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 110 (nom. nud.). *Astrocrinites*, T. & T. Austin, March 1843, Ann. Mag. Nat. Hist. (1) xi, p. 206. *Zygoocrinus*, H. G. Bronn, 1848, Index Pal., Nomenclator, p. 1381. *Zygoocrinus*, C. F. Roemer, 1851, Arch. Naturges. xvii (i), p. 390. *Astrocrinus*, emend., R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 297. Type-species—*Z. tetragonus*.

**Zygoocrinus benniei.** *Astrocrinites benniei*, R. Etheridge fil., 1876, Quart. Journ. Geol. Soc. xxxii, p. 103. *Astrocrinus benniei*, R. Etheridge fil.: R. Etheridge fil. & P. H. Carpenter, 1883, Ann. Mag. Nat. Hist. (5) xi, p. 237; and 1886, Cat. Blastoidea Brit. Mus. p. 301, pl. xix, f. 1, pl. xx, ff. 3-20.

——. Lower Carboniferous, Carboniferous Limestone, Shale over No. 2 Limestone: E. Salton, Haddingtonshire, Scotland.

[E. 667.] Presented by P. H. Carpenter. Ten specimens.

[E. 1113.] Presented by J. Bennie. Eight specimens.

[**Zygocrinus benniei**, continued.]

- Lower Carboniferous, Carboniferous Limestone, Shale over No. 2 Limestone: Skateraw, near Dunbar, Scotland. [E. 1111.] Presented by J. Bennie. Four specimens.
- Lower Carboniferous, Carboniferous Limestone, Shale over No. 2 Limestone: Kidlaw, Haddingtonshire, Scotland. [E. 1112.] Presented by J. Bennie. Seven specimens.
- Lower Carboniferous, Carboniferous Limestone, Shale over No. 2 Limestone: Carlops Quarry, Peebleshire, Scotland. [E. 1378.] In exchange from Geol. Survey, Scotland. Twenty-one specimens.

**Zygocrinus tetragonus.** *Astracrinites tetragonus*, nom. nud., T. & T. Austin, 1842, Ann. Mag. Nat. Hist. (1) x, p. 110. *Astrocrinities tetragonus*, T. & T. Austin, March 1843, Ann. Mag. Nat. Hist. (1) xi, p. 206. *Zygocrinus tetragonus* (Austin): H. G. Bronn, 1848, Index Pal., Nomenclator, p. 1381. *Astrocrinus tetragonus*, Austin: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 300.

*Astrocrinus tetragonus*, Austin: R. Etheridge fil., 1876, Quart. Journ. Geol. Soc. xxxii, pp. 109, 114, pl. xiii, f. 26; and R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. pp. 26, 300, pl. xx, ff. 1, 2. Lower Carboniferous, Carboniferous Limestone: Yorkshire, England. [75995.] Specimen identified and presented by Major Austin.

*Astrocrinus tetragonus*, Austin: R. Etheridge fil. & P. H. Carpenter, 1886, Cat. Blastoidea Brit. Mus. p. 300. Lower Carboniferous, Carboniferous Limestone: Settle, Yorkshire, England. [E. 850.] A perfect theca.











